

To: Gude, Karen[Gude.Karen@epa.gov]
From: Campbell, Ann
Sent: Thur 12/29/2016 12:35:12 PM
Subject: Re: Request for meeting with EPA Administrator Gina McCarthy re PAGs

Thanks Karen. Based on Peters email last night I'm thinking we should try to have the meeting Wednesday afternoon. That would be 1/4. I know that's not a date they were looking at but I don't think we're going to want things to fall to the next week.

On Dec 28, 2016, at 8:54 PM, Gude, Karen <Gude.Karen@epa.gov> wrote:

I'll send her contact info first thing tomorrow.

Thanks,
Karen

Sent from my iPhone

On Dec 28, 2016, at 6:22 PM, Campbell, Ann <Campbell.Ann@epa.gov> wrote:

I think we need to start with the 6th and go from there. Do you have Diane's contact information? I think I may need to either contact her myself or have Peter contact her to establish expectations.

On Dec 28, 2016, at 4:05 PM, Gude, Karen <Gude.Karen@epa.gov> wrote:

Ann,

Diane D'Arrigo (NIRS) has asked that we schedule with Joel before the DW PAG is signed. She has indicated that 12/6, 12/9, or 12/11 work best, as this gives her time to organize participants – it could be a dozen participants.

Obviously, we want to avoid the week of the 9th (I know that Joel is reserving that time, and I believe that Peter has conflicts on 1/10 and 1/11). We likely want to schedule this sooner rather than later anyway. Diane did indicate that she could be flexible and meet sooner, to accommodate a meeting prior to signature.

Karen

From: Campbell, Ann
Sent: Wednesday, December 28, 2016 8:58 AM
To: Beauvais, Joel <Beauvais.Joel@epa.gov>; Grevatt, Peter <Grevatt.Peter@epa.gov>
Cc: Loop, Travis <Loop.Travis@epa.gov>; Dennis, Allison <Dennis.Allison@epa.gov>; Gude, Karen <Gude.Karen@epa.gov>
Subject: FW: Request for meeting with EPA Administrator Gina McCarthy re PAGs

Wanted to give you both the heads up on this meeting request coming your way. I haven't heard where we landed with OMB late last week. The OA wants this scheduled for next week so it would be helpful to know where things are at so we can land this appropriately on the calendar. cc'ing Travis and Allison from a comms perspective.

From: Gude, Karen
Sent: Wednesday, December 28, 2016 8:55 AM
To: Campbell, Ann <Campbell.Ann@epa.gov>
Subject: FW: Request for meeting with EPA Administrator Gina McCarthy re PAGs

Ann,

A heads up --- The AO is delegating a meeting with NGOs re: DW PAGs to Joel. Liel is reaching out to the requester and will loop me in, once this is done (given that Crystal is out) so that we can get this scheduled next week.

Karen Gude, Special Assistant

U.S. Environmental Protection Agency

Office of Water

Phone: (202) 564-0831

From: Azoolin, Liel
Sent: Tuesday, December 27, 2016 10:09 AM
To: Gude, Karen <Gude.Karen@epa.gov>
Subject: FW: Request for meeting with EPA Administrator Gina McCarthy re PAGs

Hi Karen,

In our scheduling meeting last week, Matt Fritz suggested would be the best person to take this meeting. I just wanted to flag for you and make sure it's something he can do when he returns. Please let me know if it will be possible and I will loop Crystal in with their contact.

Thank you,

Liel

From: Azoolin, Liel
Sent: Wednesday, November 30, 2016 4:53 PM
To: scheduling <scheduling@epa.gov>
Subject: FW: Request for meeting with EPA Administrator Gina McCarthy re PAGs

From: Leavy, Jacqueline
Sent: Wednesday, November 30, 2016 4:45 PM
To: CMS.Sched <CMS.Sched@epa.gov>
Cc: Gaines, Cynthia <Gaines.Cynthia@epa.gov>; Azoolin, Liel <Azoolin.Liel@epa.gov>
Subject: FW: Request for meeting with EPA Administrator Gina McCarthy re PAGs

From: Diane D'Arrigo [<mailto:dianed@nirs.org>]
Sent: Wednesday, November 30, 2016 2:36 PM
To: McCarthy, Gina <McCarthy.Gina@epa.gov>; scheduling <scheduling@epa.gov>
Cc: Diane D'Arrigo <dianed@nirs.org>; Catherine Thomasson <CThomasson@psr.org>; Geoff Fettus <gfettus@nrdc.org>; John Coequyt <John.Coequyt@sierraclub.org>; Damon Moglen <dmoglen@foe.org>; Wenonah Hauter (whauter@fwwatch.org) <whauter@fwwatch.org>; Lynn Thorp CWA <lthorp@cleanwater.org>; Anna Aurilio <asquared@environmentamerica.org>; Allison Fisher <afisher@citizen.org>; Paul Gallay <PGallay@riverkeeper.org>; Catherine Lincoln <catlincoln@aol.com>; Cindy Folkers <cindy@beyondnuclear.org>
Subject: Request for meeting with EPA Administrator Gina McCarthy re PAGs

Physicians for Social Responsibility ♦ Natural Resources Defense Council

Sierra Club ♦ Friends of the Earth ♦ Food and Water Watch

Clean Water Action ♦ Public Citizen ♦ Beyond Nuclear

Nuclear Information and Resource Service

Environment America ♦ Committee to Bridge the Gap ♦ Riverkeeper

November 30, 2016

Gina McCarthy, US EPA Administrator

US EPA Headquarters

William Jefferson Clinton Building

1200 Pennsylvania Avenue, N. W. Mail Code: 1101A

Washington, DC 20460

202-564-4700

McCarthy.gina@Epa.gov

Dear Administrator McCarthy:

We understand that you are close to deciding whether to approve the 2013 Protective Action Guides (PAGs) and the additional Radionuclide Drinking Water PAGs any day now. Please take one more step before making that important decision: meet with us one more time, to clarify critical information.

As you know our groups and many others have been diligently commenting and raising serious concerns for many years about the PAGs. We believe that some of the premises that are being used to justify your final adoption of these PAGs are incorrect and ask that you meet with us one last time before proceeding.

The pending PAG proposal would upend decades of clean water protections. We think it would be appropriate for you to meet with us and consider seriously the information we have to provide before embarking on such a significant step backwards in terms of public protections.

We call your attention to a recent investigative piece on the issue by NBC Bay Area, which can be watched at <http://www.nbcbayarea.com/investigations/E-P-AS-NEW-EMERGENCY-PLAN-FOR-DRINKING-WATER-CONCERNS-MANY-401206656.html>.

After many environmental victories and successes throughout your tenure, moving the nation forward to a cleaner, safer, more energy efficient environment, we ask that you not depart with an unnecessary action that will justify enormous increases in radioactivity in drinking water.

We appreciate your service and ask you to reconsider how approving the PAGs will affect your legacy. We would be extremely grateful to meet with you at your earliest convenience, before you make this critical decision.

Sincerely,

Diane D'Arrigo*

Director Radioactive Waste Project

Nuclear Information and Resource Service

Catherine Thomasson, M.D.

Executive Director

Physicians for Social Responsibility

Damon Moglen

Senior Strategic Advisor

Friends of the Earth

Lynn Thorp

National Campaigns Director

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Senior Attorney

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Allison Fisher

Outreach Director

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Paul Gallay

President

Hudson Riverkeeper

Catherine Lincoln

Executive Coordinator

Committee to Bridge the Gap

Cindy Folkers

Radiation Specialist

Beyond Nuclear

* Point of contact: Diane D'Arrigo 202-841-8588 dianed@nirs.org

To: Gude, Karen[Gude.Karen@epa.gov]
From: Campbell, Ann
Sent: Wed 12/28/2016 11:22:23 PM
Subject: Re: Request for meeting with EPA Administrator Gina McCarthy re PAGs

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Phone: (202) 564-0831

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November 30, 2016

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US EPA Headquarters

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1200 Pennsylvania Avenue, N. W. Mail Code: 1101A

Washington, DC 20460

202-564-4700

McCarthy.gina@Epa.gov

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* Point of contact: Diane D'Arrigo 202-841-8588 dianed@nirs.org

To: Gude, Karen[Gude.Karen@epa.gov]
From: Campbell, Ann
Sent: Fri 10/7/2016 3:21:53 PM
Subject: RE: Final PAG guidance (SAN 5198) to OP for OMB review

Lovely. Thank you.

From: Gude, Karen
Sent: Friday, October 07, 2016 11:21 AM
To: Campbell, Ann <Campbell.Ann@epa.gov>
Subject: RE: Final PAG guidance (SAN 5198) to OP for OMB review

Just FYI -- CGP is close. It's going through OP management review now (through the first of three or so levels of management review), and likely will be ready to send to OMB by Tuesday...which is the date listed in ADP Tracker.

From: Campbell, Ann
Sent: Friday, October 07, 2016 11:17 AM
To: Gude, Karen <Gude.Karen@epa.gov>
Subject: RE: Final PAG guidance (SAN 5198) to OP for OMB review

Great. Thank you.

From: Gude, Karen
Sent: Friday, October 07, 2016 11:15 AM
To: Campbell, Ann <Campbell.Ann@epa.gov>
Subject: RE: Final PAG guidance (SAN 5198) to OP for OMB review

Oregon was sent to OP in advance of OMB on 10/4, so I wouldn't expect it to move to OMB quite yet.

CGP went to OP on 9/29...Per ADP Tracker, it looks like we're expecting it to move to OMB early next week. Sandy's going to give OP a quick call to see if she can get a status update on their review.

From: Campbell, Ann
Sent: Friday, October 07, 2016 11:07 AM
To: Gude, Karen <Gude.Karen@epa.gov>
Subject: RE: Final PAG guidance (SAN 5198) to OP for OMB review

Thanks. Do you know if uploaded Oregon or the CGP yet?

From: Gude, Karen
Sent: Friday, October 07, 2016 11:00 AM
To: Campbell, Ann <Campbell.Ann@epa.gov>
Subject: FW: Final PAG guidance (SAN 5198) to OP for OMB review
Importance: High

FYI – PAGs has been sent to OP.

From: Evalenko, Sandy
Sent: Friday, October 07, 2016 10:51 AM
To: Muellerleile, Caryn <Muellerleile.Caryn@epa.gov>
Cc: Arrigoni, Holly <Arrigoni.Holly@epa.gov>; Flaharty, Stephanie <Flaharty.Stephanie@epa.gov>; Gude, Karen <Gude.Karen@epa.gov>; Greene, Ashley <Greene.Ashley@epa.gov>
Subject: Final PAG guidance (SAN 5198) to OP for OMB review
Importance: High

Caryn: Attached is the Office of Water's submission of the Final Protective Action Guide for Drinking Water (PAG) (SAN 5198) for OMB review. I've attached Joel Beauvais' transmittal memo to Laura Vaught. Please let me know if you have any questions.

Thanks,

Sandy

*Sandy Evalenko
Water Policy Staff
Office of Water (4101M)
3226K WJC East
(202) 564-0264 telephone*

To: Gude, Karen[Gude.Karen@epa.gov]
From: Campbell, Ann
Sent: Fri 10/7/2016 3:16:46 PM
Subject: RE: Final PAG guidance (SAN 5198) to OP for OMB review

Great. Thank you.

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Sent: Friday, October 07, 2016 11:15 AM
To: Campbell, Ann <Campbell.Ann@epa.gov>
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Thanks,

Sandy

*Sandy Evalenko
Water Policy Staff
Office of Water (4101M)
3226K WJC East
(202) 564-0264 telephone*

To: Gude, Karen[Gude.Karen@epa.gov]
From: Campbell, Ann
Sent: Wed 5/25/2016 7:07:57 PM
Subject: RE: PAGS and LCR letter dates

Thanks. Ashley's edits to the administrator week matt sends around says a prepub will be released 6/6. Is that accurate? Christina is not as clear in her email.

From: [Gude, Karen](#)
Sent: 5/25/2016 3:06 PM
To: [Campbell, Ann](#)
Subject: FW: PAGS and LCR letter dates

Just FYI...latest on PAGs release estimates from OGWDW Communications.

From: Wadlington, Christina
Sent: Wednesday, May 25, 2016 2:56 PM
To: Dennis, Allison <Dennis.Allison@epa.gov>
Cc: Loop, Travis <Loop.Travis@epa.gov>; Gude, Karen <Gude.Karen@epa.gov>; Evalenko, Sandy <Evalenko.Sandy@epa.gov>; Flaharty, Stephanie <Flaharty.Stephanie@epa.gov>; Greene, Ashley <Greene.Ashley@epa.gov>
Subject: FW: PAGS and LCR letter dates

Alison,

Confirming my understanding for PAGS. We are publically releasing PAGS on 6/6. Therefore, we will work to get signature on 6/6. Not get the FRN published by that date.

Christina Wadlington

Communications Director

Office of Ground Water and Drinking Water

U.S. Environmental Protection Agency

Tel: 202.566.1859

Email: wadlington.christina@epa.gov

To: Nesky, Anthony[Nesky.Tony@epa.gov]; DeCair, Sara[DeCair.Sara@epa.gov]
From: Wieder, Jessica
Sent: Tue 5/3/2016 11:26:42 AM
Subject: Fw: SOP#3
PAGs Comm SOP3.pdf

Jessica Wieder
U.S. EPA
Radiation Protection Program
Center for Radiation Information and Outreach
w: 202-343-9201
c: 202-420-9353

From: Wieder, Jessica
Sent: Tuesday, May 3, 2016 7:00:41 AM
To: Nesky, Anthony
Cc: DeCair, Sara; Wieder, Jessica
Subject: Re: SOP#3

Jessica Wieder
U.S. EPA
Radiation Protection Program
Center for Radiation Information and Outreach
w: 202-343-9201
c: 202-420-9353

To: DeCair, Sara[DeCair.Sara@epa.gov]
Cc: siddhanti@endyna.com[siddhanti@endyna.com]
From: Amy Doll
Sent: Wed 4/27/2016 8:44:13 PM
Subject: Except with new TOC for PAG Manual
PAG Manual TOC EXCERPT 04-27-2016ad.docx

Hi Sara

Attached is an excerpt with the new TOC for the draft PAG Manual. PLEASE NOTE: if it gives you "Error! Bookmark Not Defined" when you open it, please just try ignore that and look for the yellow highlights!

The yellow highlights show the changes to the report organization.

As we discussed, the Introduction headings that Miguel inserted were deleted. The 4th level headings from Miguel were also removed.

A few notes, from our earlier discussions:

- Conservatism built into the PAGs was moved to end of Chapter 1
- Basis for Early Phase PAGs is now a new section at end of Chapter 2
- Basis for Intermediate Phase PAGs is now a new section at end of Chapter 4

In a few cases, I created sections to avoid having just one level of heading:

- I already sent you the new beginning for Chapter 5 to review, with the new 5.1 heading
- I made the former 3.1.3 heading into 3.2 heading because this improves the organization of that chapter and provides two second-level headings
- I reorganized the beginning of Section 2.1, and will send shortly for your review. This improves the readability and provides two third-level headings in that section.

Please let me know if you want to discuss,

Thanks,

Amy

Amy Doll

Senior Associate

EnDyna, Inc.
7926 Jones Branch Drive, Suite 620
McLean, VA 22102

adoll@endyna.com
Tel: 703-848-8842 ext. 111

To: Wieder, Jessica[Wieder.Jessica@epa.gov]; DeCair, Sara[DeCair.Sara@epa.gov]; White, Rick[White.Rick@epa.gov]
From: Nesky, Anthony
Sent: Mon 4/18/2016 9:03:38 PM
Subject: PAGs Comm Q&A with Cover
[PAGs Comm Tool QA 4-18-16+cover.docx](#)

Here's the latest version of the PAG Comm Q&A, with a mock-up cover.

Tony Nesky

Center for Radiation Information and Outreach

Tel: 202-343-9597

nesky.tony@epa.gov

From: Wieder, Jessica
Sent: Monday, April 18, 2016 3:12 PM
To: DeCair, Sara <DeCair.Sara@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>
Cc: White, Rick <White.Rick@epa.gov>
Subject: PAGs Comm Q&A

Here is the document with the updated foreword and formatted Q&A.

Tony- Please add the cover and send it back around. When you add the cover, please make sure that the Q&A starts at the top of page 1.

This has been a very productive process. I am really happy with how the document is coming together. Thank you!

Jess

Jessica Wieder

U.S. EPA

Radiation Protection Program

Center for Radiation Information and Outreach

w: 202-343-9201

C: Ex. 6 - Personal Privacy

To: DeCair, Sara[DeCair.Sara@epa.gov]; Nesky, Anthony[Nesky.Tony@epa.gov]
Cc: White, Rick[White.Rick@epa.gov]
From: Wieder, Jessica
Sent: Mon 4/18/2016 7:12:14 PM
Subject: PAGs Comm Q&A
[PAGs Comm Tool QA 4-18-16.docx](#)

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To: DeCair, Sara[DeCair.Sara@epa.gov]
Cc: siddhanti@endyna.com[siddhanti@endyna.com]; Amy Doll[adoll@endyna.com]
From: Miguel Tuason
Sent: Tue 4/12/2016 3:27:59 PM
Subject: RE: PAGS - Final Cover and Draft Inside Graphic
[EPA PAGS Cover 04122016.pdf](#)
[MASTER 2016April DRAFT003.pdf](#)

Hello, Sara –

Here is the new cover and new inside keyhole graphics, with your changes incorporated, for your review.

Please let us know if there are any additional changes.

Best

Miguel

Miguel Tuason
SR. BUSINESS DEVELOPMENT MANAGER
EnDyna, Inc.
7926 Jones Branch Drive
Suite 620
McLean, VA 22102
Tel: [703 848 8842 ext. 120](tel:7038488842)
Cell: [571 218 7505](tel:5712187505)
Fax: [703 848 9001](tel:7038489001)
www.endyna.com

From: DeCair, Sara [mailto:DeCair.Sara@epa.gov]
Sent: Monday, April 11, 2016 5:27 PM
To: Miguel Tuason <mtuason@endyna.com>
Cc: Smita Siddhanti <Siddhanti@endyna.com>; Amy Doll <adoll@endyna.com>
Subject: RE: PAGS - Final Cover and Draft Inside Graphic

Hi Miguel,

On the inside graphic for the keyhole, could you change it to yellow being darkest of one color (blue?) then the pink be the next lighter, then the shelter area lightest blue? Then the plume deposition fade out looks good.

Shelter area should read “area in which people are sheltered.” Maybe with no periods on any of the key.

And for the front cover, my bosses really liked the 3/16/2016 one you sent, and just asked that the title lines be spread out a little, and PAG Manual can be a bit larger than the rest of it.

Many thanks!

Sara

From: Miguel Tuason [<mailto:mtuason@endyna.com>]
Sent: Thursday, March 24, 2016 12:23 PM
To: DeCair, Sara <DeCair.Sara@epa.gov>
Cc: siddhanti@endyna.com; Amy Doll <adoll@endyna.com>
Subject: RE: PAGS - Final Cover and Draft Inside Graphic

Hello Sara –

Here is a modified version with the following changes:

- Colors now include patterns, which are colorblind-friendly.

- Map has been faded and blurred so nothing specific can be identified on it... but still maintains that “map” feel.
- The cloudy trail of contamination has been shrunk, as you noted, to just passed the 10-mile areas.
- Finally, I’ve added a “two-mile” marker on the graphic to give it scale.

Hope this version gets us closer.

Thanks again for sending over your comments.

Best
Miguel

Miguel Tuason
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7926 Jones Branch Drive
Suite 620
McLean, VA 22102
Tel: 703 848 8842 ext. 120
Cell: 571 218 7505
Fax: 703 848 9001
www.endyna.com

From: Miguel Tuason
Sent: Thursday, March 24, 2016 9:51 AM
To: 'DeCair, Sara' <DeCair.Sara@epa.gov>
Cc: Smita Siddhanti <Siddhanti@endyna.com>; Amy Doll <adoll@endyna.com>
Subject: RE: PAGS - Final Cover and Draft Inside Graphic

Thanks for the feedback, Sara.

Will get on the “drawing board” and develop a few more options based on this feedback in the next day or so.

Best

Miguel

Miguel Tuason
SR. BUSINESS DEVELOPMENT MANAGER
EnDyna, Inc.
7926 Jones Branch Drive
Suite 620
McLean, VA 22102
Tel: 703 848 8842 ext. 120
Cell: 571 218 7505
Fax: 703 848 9001
www.endyna.com

From: DeCair, Sara [<mailto:DeCair.Sara@epa.gov>]
Sent: Thursday, March 24, 2016 9:32 AM
To: Miguel Tuason <mtuason@endyna.com>
Cc: Smita Siddhanti <Siddhanti@endyna.com>; Amy Doll <adoll@endyna.com>
Subject: RE: PAGS - Final Cover and Draft Inside Graphic

Good morning Miguel, and Smita and Amy too!

I love the new cover. It is a great color and I'm going to show it to my Comms colleagues and my Office Director this afternoon to see what he thinks.

On the Keyhole graphic, I like the way it is going. Could you make the following changes?

- Obscure the big city names so it's less identifiable, or maybe fade back the map features
- The length of the Evac, Shelter and Relocate areas all should be less than 10 miles
- Make the cloudy trailing contamination to the right end not far from the end of the Relocation area – it should show that just a little contamination is outside the areas, but not very far.

- Think about ways the color blind can distinguish the key, too.

Thank you so much!

Sara

From: Miguel Tuason [<mailto:mtuason@endyna.com>]
Sent: Thursday, March 17, 2016 1:29 PM
To: DeCair, Sara <DeCair.Sara@epa.gov>
Cc: siddhanti@endyna.com; Amy Doll <adoll@endyna.com>
Subject: PAGS - Final Cover and Draft Inside Graphic

Hello, Sara –

Thanks for taking the time to speak with me and Amy yesterday about the PAGS cover and inside “plume” graphic.

Per your feedback, I’ve attached the “final” cover as a PDF with the updated color you suggested.

Also attached, as discussed, is a re-worked, color version of the “Generalized Protective Action Areas for NPP Incident” graphic that will replace the current b/w version inside the manual. Please review and let us know if this version works better and along the lines of what you described. I’ve used the map of Colorado/Nebraska/Kansas as the background to give it a bit of depth and context. We can, of course, make the location less obvious (or use a plain background) in the final version, if you’d prefer.

Thanks in advance for providing your feedback.

Best,

Miguel

Miguel Tuason
SR BUSINESS DEVELOPMENT MANAGER

EnDyna, Inc.

7926 Jones Branch Drive
Suite 620
McLean, VA 22102
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Cell: 571 218 7505
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www.endyna.com

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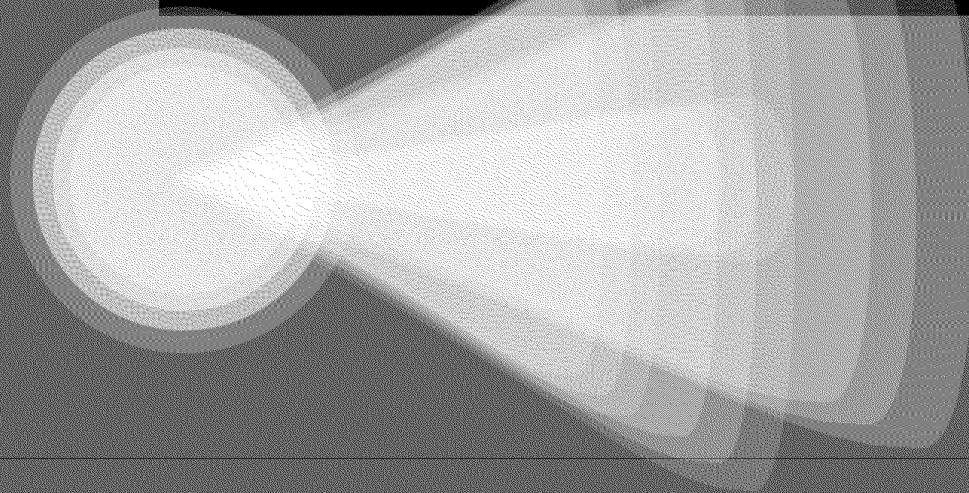


United States
Environmental Protection
Agency

EPA-XXX/X-XX/XXX | Month YYYY | www.epa.gov/xxxxxx

PAG Manual

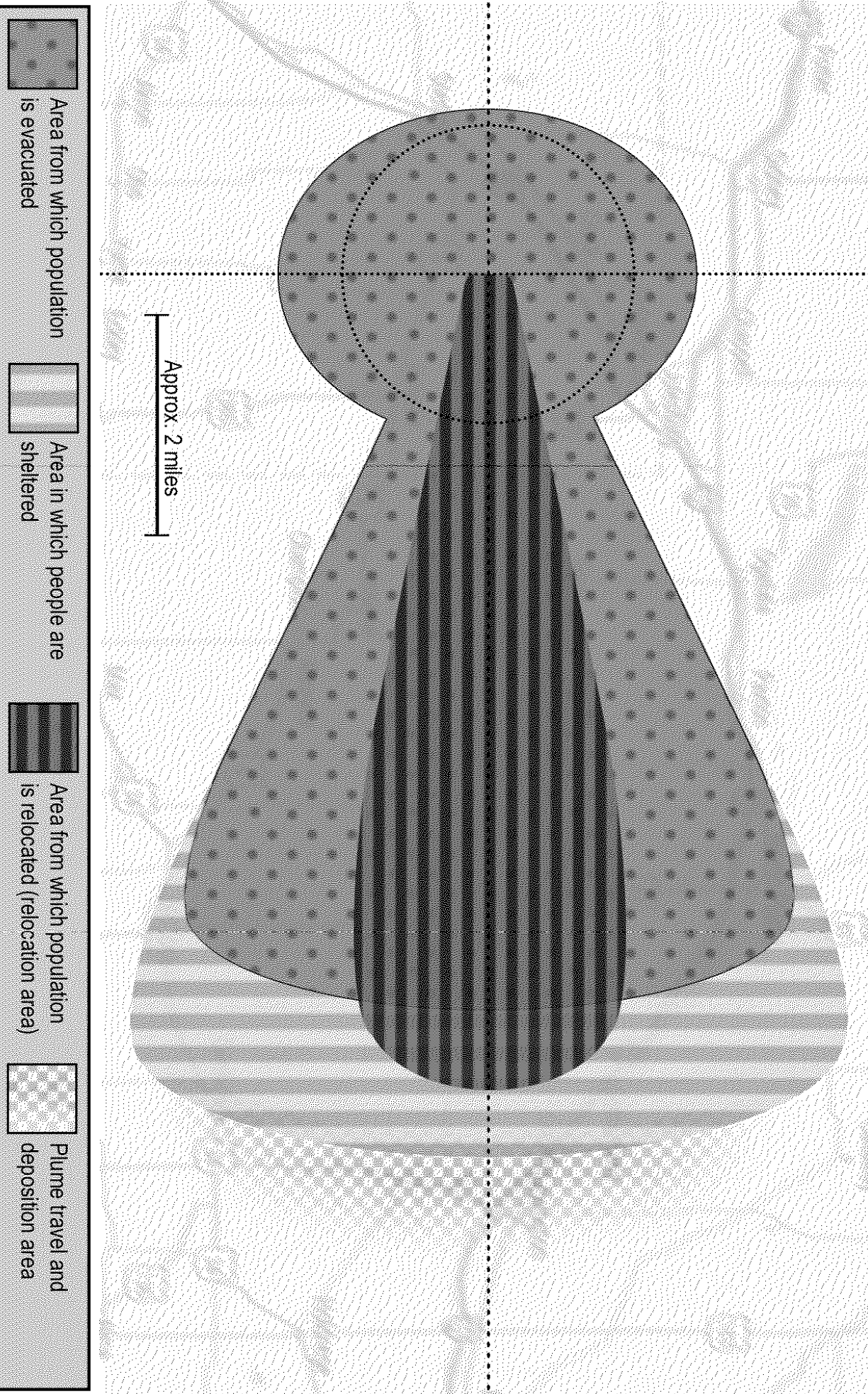
Protective Action Guides and Planning Guidance for Radiological Incidents



Manual of Protective Action Guides and Protective Actions for Nuclear Incidents

**Prepared for the U.S. Environmental Protection Agency
Office of Air and Radiation (OAR), Radiation Protection Division (RPD)**

Month YYYY



To: DeCair, Sara[DeCair.Sara@epa.gov]
Cc: siddhanti@endyna.com[siddhanti@endyna.com]
From: Amy Doll
Sent: Tue 4/12/2016 3:09:37 PM
Subject: Portrait draft of Reentry Matrix
Table 4-2 PORTRAIT_041216.docx

Hi Sara

Attached is the Portrait draft of the Reentry Matrix that I developed for your review. We discussed this morning that you'd share this with your colleague, and then let us know whether to use this Portrait version in the manual.

For now, I've got this in a separate file – so please feel free to edit the attached file at EPA if you want.

Please let me know if you have any questions, or need anything else as you are reviewing it.

I put in the header and footer, just so you can see how the Portrait version will look after insertion into the manual.

Thanks,

Amy

Amy Doll

Senior Associate

EnDyna, Inc.
7926 Jones Branch Drive, Suite 620
McLean, VA 22102

adoll@endyna.com
Tel: 703-848-8842 ext. 111

To: DeCair, Sara[DeCair.Sara@epa.gov]
From: Laiche, Thomas P
Sent: Mon 4/4/2016 7:28:58 PM
Subject: Sanity Check
EPA PAG Manual Update.pptx

Sara,

Would you mind looking at the attached slides and correct if our statements are outdated.

Thanks

Tom

To: DeCair, Sara[DeCair.Sara@epa.gov]
Cc: Nesky, Anthony[Nesky.Tony@epa.gov]
From: Wieder, Jessica
Sent: Wed 2/24/2016 6:11:31 PM
Subject: PAGs - Draft Q&A
[PAG Internal Q&A 2-24-2016 \(2\).docx](#)

For your review.

Jessica Wieder
U.S. EPA
Radiation Protection Program
Center for Radiation Information and Outreach
w: 202-343-9201
c: 202-420-9353

To: DeCair, Sara[DeCair.Sara@epa.gov]; Perrin, Alan[Perrin.Alan@epa.gov]
Cc: Wieder, Jessica[Wieder.Jessica@epa.gov]; White, Rick[White.Rick@epa.gov]
From: Nesky, Anthony
Sent: Wed 2/24/2016 5:57:26 PM
Subject: OPTIONAL edit for PAG FR announcement.
PAG Manual Finalized FR Notice 2-24-2016-tnedits.docx

I just broke up a long sentence under DATES. The announcement was OK as written if you are pressed for time.

From: DeCair, Sara
Sent: Wednesday, February 24, 2016 12:26 PM
To: Perrin, Alan
Cc: Wieder, Jessica; Nesky, Anthony
Subject: PAG Manual FR Notice with 'what we heard'

Here is an updated draft FR Notice, that includes edits from Alan and a version of "What We Heard" from the public comments – just FYI.

Sara D. DeCair

<http://www.epa.gov/radiation/rert/pags.html>

202-343-9108

Room 1416 B in WJC West

ENVIRONMENTAL PROTECTION AGENCY**[EPA-HQ-OAR-2008-0268; FRL-9707-2]****Final revision to Protective Action Guides Manual: Protective Action Guides (PAGs) and Planning Guidance for Radiological Incidents****AGENCY:** Environmental Protection Agency (EPA).**ACTION:** Notice of document availability.

SUMMARY: As part of its mission to protect human health and the environment, the U.S. Environmental Protection Agency (EPA) publishes protective action guides to help federal, state, local and tribal emergency response officials make radiation protection decisions during emergencies. EPA, in coordination with a multi-agency working group within the Federal Radiological Preparedness Coordinating Committee (FRPCC), has finalized updates to the 1992 Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, referred to as "The 1992 PAG Manual" (EPA 400-R-92-001, May 1992).

The updated guidance in this revised PAG Manual – Protective Action Guides and Planning Guidance for Radiological Incidents ("PAG Manual" hereafter) applies the PAGs to incidents other than just nuclear power plant accidents, updates the radiation dosimetry and dose calculations based on current science and incorporates late phase guidance. The final revisions incorporate input from public comments received in 2013 and include clarifications based on those comments. {{We have to talk about water here, whether it is in or not}} The final revision is available at www.regulations.gov.

DATES: This guidance may be used immediately. Most organizations that use the PAGs in their emergency management plans will be expected to have incorporated this updated guidance within twelve months of this announcement.

FOR FURTHER INFORMATION CONTACT: Sara DeCair, Radiation Protection Division, Center for Radiological Emergency Management, Mail Code 6608T, U.S. Environmental Protection Agency, 1200 Pennsylvania Avenue NW, Washington, DC 20460; telephone number: (202) 343-9108 ; fax number: (202) 343-2304; E-mail: decair.sara@epa.gov.

SUPPLEMENTARY INFORMATION:

A. How can I get copies of the PAG Manual and supporting information?

Docket: All documents in the docket are listed in the www.regulations.gov index. Although listed in the index, some information is not publicly available, e.g., CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in hard copy. The EPA has established a docket for this action under Docket ID No. [EPA-HQ-OAR-2008-0268; FRL-9707-2]. Publicly available docket materials are available either electronically through www.regulations.gov or in hard copy at the Air and Radiation Docket in the EPA Docket Center, (EPA/DC) EPA West, Room 3334, 1301 Constitution Ave., NW, Washington, DC 20004. The EPA Docket Center Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744 and the telephone number for the Air and Radiation Docket is (202) 566-1742. In accordance with EPA's regulations at 40 CFR Part 2 and in accordance with normal EPA docket procedures, if copies of any docket materials are requested, a reasonable fee may be charged for photocopying.

Electronic access: The PAG Manual in electronic form suitable for printing as well as related guidelines and further information can be found on the PAGs web page, at <http://www.epa.gov/radiation/protective-action-guides-pags>

B. What authority does the EPA have to provide Protective Action Guidance?

The historical and legal basis of EPA's role in the PAG Manual begins with Reorganization Plan No. 3 of 1970, in which the Administrator of the EPA assumed functions of the Federal Radiation Council (FRC), including the charge to "...advise the President with respect to radiation matters, directly or indirectly affecting health, including guidance for all federal agencies in the formulation of radiation standards and in the establishment and execution of programs of cooperation with states." (Reorg. Plan No. 3 of 1970, sec. 2(a) (7), 6(a) (2); § 274.h of the Atomic Energy Act of 1954, as amended (AEA), codified at 42 U.S.C. § 2021(h)). Recognizing this role, FEMA directed the EPA in their Radiological Emergency Planning and Preparedness Regulations to "establish Protective Action Guides (PAGs) for all aspects of radiological emergency planning in coordination with appropriate federal agencies." (44 CFR 351.22(a)). FEMA also tasked the EPA with preparing "guidance for state and local governments on implementing PAGs, including recommendations on protective actions which can be taken to mitigate the potential radiation dose to the population." (44 CFR 351.22(b)). All of this information was to "be presented in the Environmental Protection Agency (EPA) 'Manual of Protective Action Guides and Protective Actions for Nuclear Incidents.'" (44 CFR 351.22(b)).

Additionally, section 2021(h) charged the Administrator with performing "such other functions as the President may assign to him [or her] by Executive order." Executive Order 12656 states that the Administrator shall "[d]evelop, for national security emergencies, guidance

on acceptable emergency levels of nuclear radiation....” (Executive Order No. 12656, sec.1601(2)). EPA’s role in PAGs development was reaffirmed by the *National Response Framework, Nuclear/Radiological Incident Annex* of June 2008.

C. What is the PAG Manual: Protective Action Guides and Planning Guidance for Radiological Incidents?

The PAG Manual provides federal, state and local emergency management officials with guidance for responding to radiological emergencies. A protective action guide (PAG) is the projected dose to an individual from a release of radioactive material at which a specific protective action to reduce or avoid that dose is recommended. Emergency management officials use PAGs for making decisions regarding actions to protect the public from exposure to radiation during an emergency. Such actions include, but are not limited to, evacuation, shelter-in-place, temporary relocation, and food restrictions.

Development of the PAGs was based on the following essential principles, which also apply to the selection of any protective action during an incident—

- Prevent acute effects.
- Balance protection with other important factors and ensure that actions result in more benefit than harm.
- Reduce risk of chronic effects.

The PAG Manual is not a legally binding regulation or standard and does not supersede any environmental laws; PAGs are not intended to define “safe” or “unsafe” levels of exposure or contamination. This guidance does not address or impact site cleanups occurring under other

statutory authorities such as the United States Environmental Protection Agency's (EPA) Superfund program, the Nuclear Regulatory Commission's (NRC) decommissioning program, or other federal or state cleanup programs. As indicated by the use of non-mandatory language such as "may," "should" and "can," the PAG Manual only provides recommendations and does not confer any legal rights or impose any legally binding requirements upon any member of the public, states, or any other federal agency. Rather, the PAG Manual recommends projected radiation doses at which specific actions may be warranted in order to reduce or avoid that dose. The PAG Manual is designed to provide flexibility to be more or less restrictive as deemed appropriate by decision makers based on the unique characteristics of the incident and the local situation.

D. What has changed since the 2013 draft revised PAG Manual?

The updates to the 1992 PAG Manual, published for public comment and interim use in 2013, were developed by a multi-agency Subcommittee of the Federal Radiological Preparedness Coordinating Committee (FRPCC) and are published by the EPA with concurrence from the Department of Energy (DOE); the Department of Defense (DoD); the Department of Homeland Security (DHS), including the Federal Emergency Management Agency (FEMA); the Nuclear Regulatory Commission; the Department of Health and Human Services (HHS), including both the Centers for Disease Control (CDC) and the Food and Drug Administration (FDA); the U.S. Department of Agriculture (USDA); and the Department of Labor (DOL).

We received 5,000 comments from members of the public, state and local emergency response and health organizations, industry associations, and from national and international radiation protection organizations. Based on questions raised in comments and issues identified

about implementing the updated PAG Manual, significant changes we made include:

- Clarifying planning considerations related to the lower FDA KI (supplemental) PAG in combination with deleting the thyroid-based evacuation threshold
- Providing additional language on implementing the FRMAC tables of derived values
- Adding information from the appendices of the 1992 PAG Manual on how the PAG levels were set, in “Basis” sections
- {{placeholder for how we’re addressing water}}
- Providing explanation about the removal of the Relocation PAG of 5 rem over 50 years to avoid confusion with long-term cleanup goals

E. What is being done to address concerns raised in the public comments?

The major themes we heard from commenters are grouped under these headings: (1) maintaining the strength of environmental regulations; (2) PAGs are higher than radiation protection standards; (3) concern about the need for PAGs; and (4) concern about the cleanup (remediation) process guidance.

Concern: Many commenters expressed concern that the PAG Manual is a way to weaken environmental regulations.

Environmental regulations or standards are legal limits designed to prevent health effects from everyday exposure to low levels of radiation over long periods. The PAG levels are emergency guidance and do not overturn or affect the stringency or enforcement of any standards or laws, or how they apply. The PAG levels are used only in an emergency when

radiation levels have already exceeded environmental standards and could be high enough to cause health effects unless something is done. The PAG levels trigger public safety measures to minimize or avoid radiation exposure during an emergency.

Concern: The fact that the PAGs are higher than existing radiation protection regulations means that the EPA is allowing the public to get more radiation exposure.

- PAGs are guidance for use only in an emergency. Potential increased risk for cancer from radiation exposure at the PAG levels is approximately 0.12% or 12 additional cancers out of 10,000 people. If used early in an emergency, the PAG guidance could trigger safety actions to prevent the public from getting any additional exposure at all—they could be evacuated before the arrival of a radioactive plume. The PAG safety actions can be triggered by projected doses—officials do not have to wait for radiation measurements to order public safety measures if they have any reason to suspect that the radiation could approach the PAG levels. Actual exposures are likely to be much lower than projected doses, if protective actions are taken and especially if they're taken early. The whole point of protective actions is to avoid risks.

- The PAG Manual provides guidance for emergency situations only. No one is permitting a radiological accident or terrorist event. As long there are nuclear materials in the world, we have the responsibility to plan responses to protect the public from potential releases. The PAG Manual is emergency guidance, not a legal standard, and it does not set cleanup, or remediation, levels.

- The PAG Manual is a non-binding guidance document to help officials plan safety measures in the event of a radiological emergency. Standards are legally enforceable limits on radioactive emissions. The PAG Manual has no bearing on the interpretation, enforcement, or

setting of standards. The PAG Manual was first issued in 1975, and has no effect on environmental regulations.

Concern: The PAG Manual is not necessary. You should just base your emergency responses on existing environmental standards instead of the higher PAG triggers.

- The PAGs are designed to prevent health effects by triggering public safety measures, such as evacuation. The PAG levels are higher than legal standards because they are based on the risk of health effects from radiation levels high enough to warrant having people evacuate or stay indoors for extended periods. The additional risk from a slight increase over legal limits is not worth the known risks of evacuation or sheltering in place, traffic accidents, trips and falls, anxiety from separation of family members, etc. The PAGs are set at a level where the health risk from radiation exposure outweighs the risk from the safety measures. Although higher than legal standards, the PAG levels are still highly protective, and the guidance in the PAG Manual is designed to minimize unnecessary exposure.

- Emergency preparedness starts with prevention, including radioactive materials regulation, nuclear facility siting and minimizing risks from industry. Preventing accidents by ensuring safety redundancies and by preparing local responders to take quick actions will save people from disasters. PAGs are focused on recommending the best prompt actions when bad things are happening.

Concern: The cleanup guidance in the PAG Manual allows too much radiation.

- The PAG Manual is non-binding guidance for emergency situations and does not set cleanup levels. Chapter 4 of the PAG Manual provides a list of considerations for planning and

initiating a cleanup (remediation) process after the emergency is brought under control, but does not prescribe end goals. Remediation may take a long time and some safety measures may be necessary for years. For instance, some restrictions on use of certain areas may be in place for a long time.

- Where remediation doesn't achieve background levels, land use might have to be restricted. Superfund, for instance, balances reduced exposure with practical requirements of removing the contamination.
- Remediation levels will be decided by decision makers along with community members to balance the goals with their needs. Jobs, homes, social, practical and technical factors will inform the remediation goals. How long the remediation takes will directly impact people's ability to work and live in an area. This process can be sped up with additional funding, workers, equipment, technology and collaboration with local residents helping out.

F. What is the timeframe for implementation of this PAG Manual?

Emergency management and radiation protection organizations that use the PAGs in their emergency plans will be expected to have incorporated this updated guidance within twelve months of this announcement. During this time, training, plans, and procedures can be updated. By agreement with the Federal Emergency Management Agency, evaluation of offsite response organizations around nuclear power facilities based on the new PAG Manual will begin twelve months after the date of this Notice. Outreach and technical training will be conducted by the EPA, the FRMAC and interagency partners of the PAG Subcommittee.

For further information and related guidelines, see the PAGs web page:

<http://www.epa.gov/radiation/protective-action-guides-pags>

Dated:

Stan Meiburg,
Deputy Administrator.

To: Wieder, Jessica[Wieder.Jessica@epa.gov]
Cc: Nesky, Anthony[Nesky.Tony@epa.gov]; DeCair, Sara[DeCair.Sara@epa.gov]; White, Rick[White.Rick@epa.gov]
From: Becker, Steven M.
Sent: Wed 2/10/2016 9:30:18 PM
Subject: Suite of Materials
[1 - Using the Suite of Materials.docx](#)
[2 - PAGs Protect Q&As - Full.docx](#)
[3 - PAGs Protect Slide Deck.ppt](#)
[4 - PAGs Protect Q&As - Brief.docx](#)
[5 - Rad Terrorism Comprehensive Q&As.docx](#)
[TF Project 6 Final Report December 2013.pdf](#)

Hi Jess,

Here is the entire Suite of Materials.

The work was federally funded (DHS). But I am not sure what the policy is regarding citation/credit to DHS DNDO, the Task Force, Old Dominion U., etc. Is this something we should ask Rich about?

All the best,

Steve

-----Original Message-----

From: Wieder, Jessica [mailto:Wieder.Jessica@epa.gov]
Sent: Wednesday, February 10, 2016 12:18 PM
To: Becker, Steven M.
Subject: RE: PAGs Messages

Thank you, Steve!

Jessica Wieder
U.S. EPA
Radiation Protection Program
Center for Radiation Information and Outreach
w: 202-343-9201
c: 202-420-9353

From: Becker, Steven M. [smbecker@odu.edu]
Sent: Wednesday, February 10, 2016 12:00 PM
To: Wieder, Jessica
Cc: Nesky, Anthony; DeCair, Sara; White, Rick
Subject: RE: PAGs Messages

Hi Jess,

Yes, absolutely, I would be happy to do so.

I will send the entire folder (suite of materials) later today.

All the best,

Steve

-----Original Message-----

From: Wieder, Jessica [mailto:Wieder.Jessica@epa.gov]
Sent: Wednesday, February 10, 2016 11:27 AM
To: Becker, Steven M.
Cc: Nesky, Anthony; DeCair, Sara; White, Rick
Subject: RE: PAGs Messages

Hi Steve,

I hate to be a pain, but can you send me ALL of the Q&As in a word file. These would include the messages for special populations and the dirty bomb specific questions. I want whatever we put out to include all of the specialized messages that don't exist anywhere else just yet.

Thank you!

Jess

Jessica Wieder
U.S. EPA
Radiation Protection Program
Center for Radiation Information and Outreach
w: 202-343-9201
c: 202-420-9353

From: Becker, Steven M. [smbecker@odu.edu]
Sent: Monday, February 1, 2016 9:21 AM
To: Wieder, Jessica
Cc: Nesky, Anthony; DeCair, Sara; White, Rick
Subject: RE: PAGs Messages

Hi Jess,

Good morning! Attached please find the PAGs materials in accessible formats. There are three files:

1. The full PAGs Q&A (WORD file)
2. An abbreviated PAGs Q&A (WORD file)
3. The PAGs slide deck (Powerpoint)

If you need anything else, please don't hesitate to contact me.

All the best,

Steve

From: Wieder, Jessica [mailto:Wieder.Jessica@epa.gov]
Sent: Monday, February 01, 2016 7:23 AM
To: Becker, Steven M.
Cc: Nesky, Anthony; DeCair, Sara; White, Rick
Subject: RE: PAGs Messages

Steve - I appreciate the help. As soon as you can get me the materials, we can start working on them.

Jessica

Jessica Wieder
U.S. EPA
Radiation Protection Program
Center for Radiation Information and Outreach
w: 202-343-9201
c: 202-420-9353

From: Becker, Steven M. [mailto:smbecker@odu.edu]
Sent: Friday, January 29, 2016 2:41 PM
To: Wieder, Jessica <Wieder.Jessica@epa.gov<mailto:Wieder.Jessica@epa.gov>>
Subject: RE: PAGs Messages

Sorry it has taken so long... it has just been nutso busy around here.

From: Wieder, Jessica [mailto:Wieder.Jessica@epa.gov]
Sent: Friday, January 29, 2016 2:40 PM
To: Becker, Steven M.
Subject: Re: PAGs Messages

Thank you!
Jessica Wieder
U.S. Environmental Protection Agency
Radiation Protection Program
202-343-9201
m: 202-420-9353

Sent from my iPhone

On Jan 29, 2016, at 2:25 PM, Becker, Steven M. <smbecker@odu.edu<mailto:smbecker@odu.edu>>
wrote:
Found the materials... stay tuned.

-----Original Message-----

From: Becker, Steven M.
Sent: Tuesday, January 26, 2016 1:57 PM
To: 'Wieder, Jessica'
Subject: RE: PAGs Messages

Hi Jess,

The snowstorm ended up being fun for us. Norfolk only got 2-3 inches of snow between the two bands that affected the area. So we had enough for snowballs and snowmen but not so much as to be a pain. (It was also merciful for the storm not to be too bad. I was too jet-lagged to deal with more than a little bit of shoveling!)

Yikes, I cannot believe how much snow DC and surrounding areas received! I hope the situation has at least given you some pretty scenes to view and some nice, relaxing family time to enjoy.

Re: the PAGs messages -- That is terrific! I am glad EPA will be able to make use of some of the content. I will go the archive later today, get the original WORD files out, and send them to you.

Stay safe!

All the best,

Steve

-----Original Message-----

From: Wieder, Jessica [mailto:Wieder.Jessica@epa.gov]

Sent: Tuesday, January 26, 2016 7:20 AM

To: Becker, Steven M.

Subject: PAGs Messages

Hi Steve,

I hope you made it back from your travels before the storm. How did you and your family weather the storm? After not seeing a plow since 7 pm on Friday, my street banded together yesterday and hand shoveled 30 inches of snow from the court to the main street. It was a truly impressive act of a community working together. We will have a problem if two cars are headed in different directions, but at least we have a way out if we need it.

When you get a chance, can you please send me an editable version of the PAGs messages? We briefed our management and EPA is going to take the lead on publishing the Q&As. Some will go on the web as FAQs and some will end up in a PAG Manual Communications Implementation Tool.

Thank you.

Jess

Jessica Wieder
U.S. EPA
Radiation Protection Program
Center for Radiation Information and Outreach
w: 202-343-9201
c: 202-420-9353

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BEGIN-ANTISPAM-VOTING-LINKS

Teach CanIt if this mail (ID 03QgFilau) is spam:

Spam: <https://www.spamtrap.odu.edu/canit/b.php?i=03QgFilau&m=3695f5018be1&t=20160210&c=s>

Not spam:

<https://www.spamtrap.odu.edu/canit/b.php?i=03QgFilau&m=3695f5018be1&t=20160210&c=n>

Forget vote: <https://www.spamtrap.odu.edu/canit/b.php?i=03QgFilau&m=3695f5018be1&t=20160210&c=f>

END-ANTISPAM-VOTING-LINKS

A Note on Using the “Suite of Materials”

The informational materials contained in this folder (“Suite of Materials”) are intended to be used in conjunction with the Task Force Project 6 Final Report (also found on this CD).

The informational materials have been designed to be used by local, state, tribal, and federal agencies and non-governmental organizations to help answer the general public’s questions about radiological terrorism, protective actions, and Protective Action Guides (PAGs).

The materials are designed to be clear, user friendly, and adaptable for use in a variety of formats and settings (e.g., fact sheets, handouts, web content, presentations, and community meetings).

In addition, the materials are designed to be used either for educational/informational purposes or as the basis for answering questions during an actual incident.

Detailed descriptions and explanations of all of the informational materials are contained in the Task Force Project 6 Final Report.

In addition, to make the materials easy for agencies to adapt and use, the following are included in the “Suite of Materials” folder:

- A copy of the full “Protective Actions/PAGs Questions and Answers” document in WORD format. The file name is *2 – PAGs Protect Q&As – Full*.
- A copy of the Powerpoint slide deck on “Protecting Public Health in a Radiation Emergency: How Do Officials Decide What Steps the Public Should Take after a Radiological Terrorism Incident?” The slide deck has been set up as a template, with space left for easy insertion of agency information, contact information, details about the local situation or incident, photos and graphics, etc. The file name is *3 – PAGs Protect Slide Deck*.
- A copy of the shorter “Protective Actions/PAGs” information sheet in WORD format. The file name is *4 – PAGs Protect Q&As - Brief*.
- A copy of the comprehensive “Radiological Terrorism Q&A Guide” in WORD format. The file name is *5 – Rad Terrorism Comprehensive Q&As*.

Protective Actions and Protective Action Guides (PAGs): Questions and Answers

Q: What is a Protective Action?

A: *Protective actions* are the urgent steps that people can take to protect their health and the health of loved ones in a dirty bomb incident or other radiation emergency.

The main protective actions that the public might be asked to take are evacuation or sheltering (staying inside).

Q. How will people know what to do?

A. Health and emergency management officials will tell the public if protective actions are needed and whether evacuation or staying inside would be more effective for avoiding radiation doses to people.

The officials make these decisions about how to protect public health by using information about local conditions and by using something called the “PAGs.”

Q. What does “PAGs” stand for?

A. The abbreviation “PAGs” is short for *Protective Action Guides*.

Q. What are Protective Actions Guides?

A. *Protective Action Guides*, or *PAGs*, are guides that help officials decide when it is necessary for people to evacuate, stay inside or take other urgent steps to safeguard health in a radiation emergency.

Every emergency situation is different, and the best action or set of actions in one situation may not be helpful at another time or in another situation.

Knowing *when* emergency steps need to be taken and *which* steps are warranted is very important for protecting the health of the public.

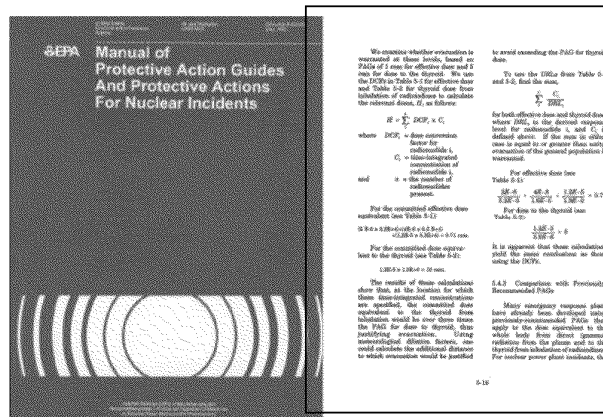
The PAGs provide general guidance to officials, which they can use together with their knowledge of local conditions, to make these important decisions.

Q: What do the PAGs look like?

A: The Manual of Protective Action Guides developed in 1991 was actually a book.

Much of it consists of pages with equations and tables with numbers developed by scientists.

More recent additions to the PAGs are not in book form, but have been published instead in the *Federal Register*.



Q. What kinds of steps are included in the PAGs?

A. The PAGs include actions that government agencies and members of the public can take to protect people's health in a radiation emergency.

In the first hours and days of a radiation emergency, there are two main protective actions that the public might be asked to take to avoid exposure to radiation: evacuation or sheltering (staying inside).

Q. What is evacuation? What is sheltering? What is the difference?

A. *Evacuation* involves quickly moving people from an area expected to be in the path of radioactive releases.

Sheltering, on the other hand, involves having people stay indoors in their homes, offices, schools or other buildings while radioactive materials pass over.

Q. Are there other steps officials might ask people to take?

A. Depending on the circumstances, other actions may also sometimes be helpful for protecting health.

For example, evacuation or sheltering could be supplemented by *limiting access* to (keeping people out of) the location where the emergency has taken place. Another step is *decontaminating people*, which means to remove any radioactive particles that may have fallen onto people's clothes, skin, or hair. Decontamination is done by having people wash, shower, and change their clothes.

Q. What about controls on food?

A. In some situations, officials may determine that it is necessary to take actions to prevent radioactive contamination from entering the food chain.

Steps might involve preventing livestock from grazing in potentially-contaminated pastures or fields and ensuring that animals only eat feed and drink water that has been previously stored.

When necessary, officials may also act to stop certain foods from coming to market or limit consumption of human food if it is suspected of being contaminated.

Q. What about taking Potassium Iodide?

A. Never take potassium iodide (also known as KI) and never give to your children unless you have been specifically advised to do so by the health department, emergency management officials, or your doctor.

Potassium iodide is a non-radioactive form of iodine.

KI can be useful in situations where radioactive iodine has been released into the environment.

It works by filling a person's thyroid gland with safe iodine so that harmful radioactive iodine in the environment is not absorbed.

But KI is only useful in situations involving radioactive iodine, and it only protects the thyroid gland; it does not help in other situations involving radioactive releases.

A dirty bomb situation is very unlikely to involve radioactive iodine.

You should only take potassium iodide if you have been specifically advised to do so by local public health officials, emergency management officials, or your doctor.

Q. How do officials know when it is time to carry out protective actions?

A. When a radiation emergency occurs, officials will use available information and computer models to quickly predict how much radiation people could potentially receive from the incident.

This estimate is then compared with decision levels described in the PAGs.

If the dose that could result from the emergency has the potential to go higher than the decision levels listed in the guidelines, the PAGs list what general actions can be taken to *avoid* the exposure from taking place.

In other words, PAGs are general guidelines for deciding when specific steps are needed to *prevent* people from being exposed to a level of radiation that might be hazardous to health.

Q. Wouldn't it make more sense to carry out all of the protective actions right away, as soon as a radiation emergency occurs?

A. No. Different safety measures are used for different situations.

Trying to take all of the measures at once would not be possible and could actually cause confusion or even harm.

For example, people cannot take shelter and evacuate at the same time.

Officials need to see what kind of hazard the emergency poses to people so they can provide the best advice on how to protect health.

Q. Why don't officials just automatically advise everyone to evacuate when a radiation emergency occurs?

A. Evacuation is one of the two main protective actions that can be taken in the immediate hours or first few days of a radiation emergency, and sometimes it is necessary for protecting people's health.

But there are also situations when sheltering may be a better choice for preventing or reducing radiation exposure.

For example, if a cloud containing radioactive particles is expected to pass over an area very soon and then leave quickly, evacuation could actually expose people to more radiation than staying indoors.

This is because evacuation takes time, and many people might be caught outside or in their cars when the cloud passed over.

So in such a situation, officials might ask people to stay indoors.

Buildings, such as large offices and structures made from brick, can provide significant protection from radiation.

So people staying indoors while the cloud passed by would be more protected than those caught outside trying to evacuate.

Sheltering also has the advantage of being less disruptive than evacuation and of enabling people to stay in familiar surroundings and have access to food, water, and information sources such as television or radio. So in some circumstances, it may be better than evacuating.

Watch or listen to official announcements to learn what steps you should take.

Q. Are there situations when evacuation might not be appropriate, or might even be harmful?

A. Yes. In some situations, evacuation may not be practical.

Blocked highways, for example, could make evacuation difficult.

Severe weather at the time of the radiation emergency could also make evacuation dangerous.

It is also important to remember that evacuations can themselves create certain risks to people.

With large numbers of people suddenly taking to the highways, automobile accidents occur and people can be killed or injured. Other vehicles may run out of gas and get stuck.

Evacuations can also be very difficult on people who are ill or in medical care. So, evacuations should only take place if they are necessary.

If the risks from a protective action such as a major evacuation are greater than the risks to people from the emergency situation itself, it makes no sense to carry out this protective action.

Officials using the PAGs and information about local conditions will tell the public whether evacuation, sheltering, or other steps (e.g., avoiding certain foods) are needed in a radiation emergency.

Q. What kinds of radiation emergencies are the PAGs used for?

A. When the U.S. Environmental Protection Agency (EPA) was created in 1970, it was given responsibility for developing PAGs. The first Protective Action Manual, which was published in 1975, focused only on accidents at commercial nuclear power plants.

But in 1991 the Protective Action Guides were revised and expanded to cover all types of peacetime radiation emergencies.

The 1991 revisions also included recommendations from the U.S. Food and Drug Administration (FDA) for protective actions if an incident causes contamination of food or animal feed.

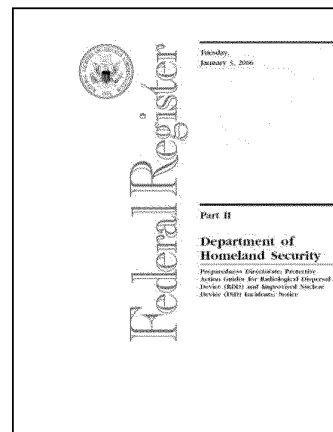
In addition, the 1991 Manual added guidance from the FDA and FEMA on the use of KI, potassium iodide, in situations involving the release of radioactive iodine.

Among the many possible situations covered in the 1991 PAGs were accidents involving U.S. nuclear power plants, accidents involving foreign nuclear reactors where the U.S. is affected, incidents involving the transportation of radioactive materials, satellite incidents, and incidents at nuclear research facilities, manufacturing or scrap metal recycling facilities, or hospitals.

More recently, in 2006, the PAGs were revised further to cover terrorism involving radioactive materials.

This includes both radiological dirty bombs (or other radiological dispersal devices, RDDs) and the exploding of a crude nuclear bomb (an IND, or improvised nuclear device).

Today, emergency responders and government officials can use the PAGs for any radiation emergency.



Q. Who uses the PAGs?

In a radiation emergency, federal, state and local emergency response agencies use the PAGs to decide when special actions are needed to avoid radiation exposure and protect people's health.

Under the system of government and the laws we have in the U.S., states and local governments have the main responsibility for deciding upon and taking measures to protect life and health.

The federal government's role in disasters is to provide assistance when it is needed.

This is true for all kinds of disasters, except war and declared national emergencies.

Q: What is the purpose of the PAGs?

A: At the most fundamental level, the purpose of the PAGs is to protect people's health.

By providing guidelines on when it is time to take protective actions, and which protective actions are best, the PAGs help prevent immediate effects and reduce the risk of longer-term effects from a radiation emergency.

The PAGs are also designed to ensure that any protective action taken does more good than harm.

Q: Are the PAGs federal standards?

A: Although the PAGs are not federal standards, they were developed by federal agencies to provide helpful guidance to state and local agencies.

The PAGs recommend precautions that state and local authorities can take during an emergency to keep people from receiving an amount of radiation that might be hazardous to their health.

State and local agencies use the PAGs, along with their knowledge of local conditions, to make decisions on how best to safeguard the population.

Q: What is the difference between a Protective Action and a PAG?

A: Protective actions are the specific steps that can be taken to avoid or reduce radiation dose. Evacuation and sheltering are examples of Protective Actions.

The PAGs are guides that tell officials when it is time to carry out protective actions and which steps are appropriate.

Q. Do the PAGs play a role in protecting people once the immediate emergency is over?

Yes. The steps described earlier are used to protect people in the early hours and days of a radiation emergency. (This is sometimes referred to as the *Early Phase*.)

But once the immediate emergency has passed, officials may recommend other steps to help protect people from longer-term exposure.

These cover what is known as the *Intermediate Phase* (which begins as soon as the emergency has been brought under control and can last days to months) and the *Late Phase* (which involves cleanup and recovery efforts lasting months to years).

One such measure is *decontamination of land and property*, which involves cleaning radioactive contamination from an area so that people can reoccupy it.

When this is not possible, another measure – *relocation* – may be required. Relocation involves moving people from an area and continuing to keep them from returning.

An additional protective action may involve placing continuing *controls on food and water*.

Q. What is the difference between evacuation and relocation?

Evacuation involves temporarily moving of people out of an area to protect them from short-term, high-level exposure to radiation, with the intention of having them return later.

Relocation involves moving people out of a contaminated area for a much longer time (or in some situations perhaps even permanently), in order to avoid chronic or long-term radiation exposure.

Q. After a terrorist attack that spreads radioactive contamination, how do officials figure out how much to clean up the area?

For Radiological Dispersal Device (RDD) or Improvised Nuclear Device (IND) incidents, the guidance for cleanup and recovery is contained in new guidelines that were issued in 2006.

The document, which is entitled *Application of Protective Action Guides for Radiological Dispersal Device (RDD) and Improvised Nuclear Device (IND) Incidents*, describes what is called an optimization process for cleanup and recovery.

Every terrorism situation will be different, with impacts potentially ranging from light contamination of a single street or building to situations involving wider destruction and contamination.

Therefore, it makes little sense to have a “one size fits all” approach to cleanup and recovery.

Keeping this in mind, the guidance does not include a pre-established numeric guideline for cleanup.

Rather, the guidance takes the approach that the process of cleanup and recovery should be developed on an incident-specific basis and should engage stakeholders, be inclusive and be community-based. This is called *optimization*.

Q: What is Optimization? How does it work?

A: The idea is to have all interested parties involved in the process, and to find an approach to cleanup and recovery that is best for that particular community.

In choosing among cleanup alternatives, the decision-making process seeks to consider and balance many factors.

These could include:

- the nature of the incident
- the areas impacted (e.g., size, location relative to population)
- the types of contamination
- human health
- public welfare
- ecological risks
- technical feasibility
- how effective clean-up will be
- costs
- potential adverse effects of clean-up activities
- long-term effectiveness
- potential economic effects (e.g., on residents, tourism, business, and industry) and public acceptability.

Optimization is a process that tries to consider all of the relevant factors and to find a balance that is acceptable to a community.

PROTECTING PUBLIC HEALTH IN A RADIATION EMERGENCY

How Do Officials Decide What Steps the Public
Should Take after a Radiological Terrorism Incident?

Understanding Protective Actions and Protective Action Guides (PAGs)

Presented by

Jane Q. Official
Official Title

Name of Radiation, Health or Emergency Management Agency
Location
Date

Why This Presentation?

- Taking the right actions in a radiation emergency is crucial for protecting public health.
- Members of the public often ask how officials decide which steps to advise the public to take.
- Terms such as Protective Actions and Protective Action Guides (PAGs) are unfamiliar to many people.



Objectives

- To discuss the meaning and importance of Protective Actions and Protective Action Guides (PAGs) in a radiation emergency
- To discuss how officials decide what actions the public should take following a radiological terrorism incident
- To invite further questions and requests for information

Introduction

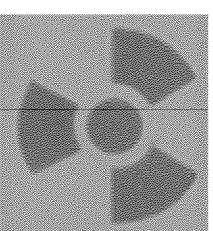
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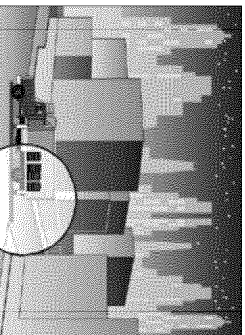
Radiological Dispersal Device (RDD)

- Combination of radioactive material and some means to disperse it
- Many possibilities
 - Liquid
 - Incendiary
 - Aerosol



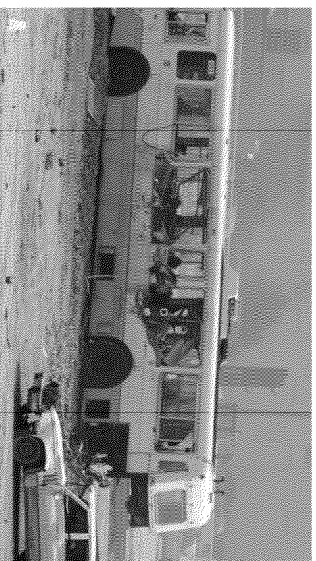
“Dirty Bomb”

- Combination of radioactive material and conventional explosive (e.g., dynamite, TNT)
 - Examples: truck bomb, planted device
- Does *not* involve a nuclear explosion
 - Dirty bomb lacks the capacity to cause the kind of massive, area-wide destruction and huge numbers of fatalities
 - Still very serious
 - Potential for tens or hundreds of deaths; major social, psychological, behavioral and economic impacts



“Dirty Bomb”

- When the conventional explosive goes off, it does what any bomb does -- kills and maims people and causes damage to nearby structures.



Destroyed city bus after mock RDD attack, TOPOFF 2 national level exercise, Seattle. Photo: Seattle Municipal Archives. Photograph Collection. Collection Record Series 0207-01 (Fleets & Facilities Imagebank). Item 138618.

“Dirty Bomb”

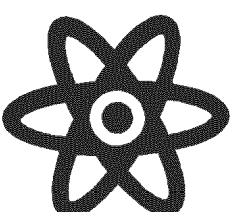
- Direct casualties primarily from detonation of the conventional explosives



TOPOFF 2 RDD Exercise, 2003, Photo credit: Erik Stuhang (Seattle Mayor Greg Nickels' Photo Gallery)

“Dirty Bomb”

- But with a dirty bomb, the explosion also disperses the radioactive material into the surrounding area with the aim of contaminating people, facilities and communities.



Protective Actions, PAGs and Public Health

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Protecting Public Health

- In a dirty bomb incident – as in any emergency – the toll in terms of deaths, injuries and illnesses can be significantly reduced if people take the right steps to protect themselves and their loved ones.
- This is where Protective Actions and the Protective Action Guides (PAGs) can help.

Protective Actions

- The urgent steps taken to avoid or reduce radiation dose to the public in an emergency are called protective actions.
- The main protective actions that the public might be asked to take right after a radiation emergency occurs are evacuation or sheltering (staying inside).

Protective Actions

- *Evacuation* involves urgently moving people from an area expected to be in the path of radioactive releases.
- *Sheltering* involves having people stay indoors in their homes, offices, schools, or other buildings while radioactive materials pass over.

How Do Officials Decide Which One to Recommend?

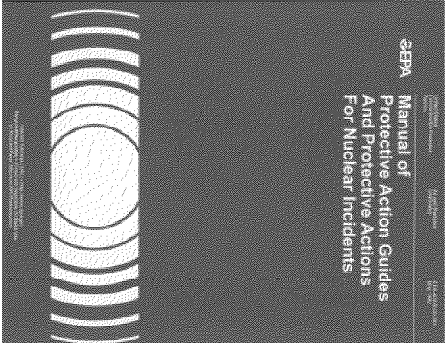
- Officials use something called the PAGs to decide whether people need to take protective actions and which steps will be most effective in avoiding or reducing radiation doses to people.
- The abbreviation “PAGs” is short for *Protective Action Guides*.

What are PAGs?

- *Protective Action Guides*, or *PAGs*, are scientific guides that were created to help officials decide when it is necessary for people to evacuate, shelter, or take other urgent steps to safeguard health after a radiation emergency has occurred.

What is in the PAGs? What Do PAGs Look Like?

- The PAGs developed in 1991 were actually in book form; much of it consists of pages with *equations and tables with numbers developed by scientists.*
- More recent additions to the PAGs are not in book form, but have been published instead in the *Federal Register*.



The exposure pathway presented in Table 2.1 is for the inhalation route. It is assumed that the exposure is from the inhalation of radionuclides from the release of a nuclear reactor. The exposure pathway is described in Table 2.1. The exposure pathway is described in Table 2.1.

Table 2.1. Exposure pathway for the inhalation route. The exposure pathway is described in Table 2.1. The exposure pathway is described in Table 2.1.

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Table 2.1. Exposure pathway for the inhalation route. The exposure pathway is described in Table 2.1. The exposure pathway is described in Table 2.1.

How are the PAGs Used?

- Every emergency situation is different, and the best action or set of actions in one situation may not be appropriate at another time or in another situation.
- Knowing *when* emergency steps need to be taken, and *which* steps are warranted, is important for protecting the health of the public.

How are the PAGs Used?

- The scientific information in the PAGs provides general guidance to officials, which they can use in combination with their knowledge of local conditions, to make these important decisions.

To What Kinds of Emergencies Do the PAGs Apply?

- The first Protective Action Manual, which was published by the EPA in 1975, focused only on accidents at commercial nuclear power plants.



Photo: Three Mile Island. A Report to the Commissioners and the Public. NUREG/CR-1250, Volume 1. U.S. Nuclear Regulatory Commission.

- But in 1991 the PAGs were expanded to cover all types of peacetime radiation emergencies (including those involving transportation, research and hospitals).

To What Kinds of Emergencies Do the PAGs Apply?

- The 1991 revisions also included recommendations from the U.S. Food and Drug Administration for protective actions if an incident causes contamination of food or animal feed.
- In addition, the 1991 Manual added guidance from the FDA and FEMA on the use of KI, potassium iodide, in situations involving the release of radioactive iodine.

To What Kinds of Emergencies Do the PAGs Apply?

- More recently, in 2006, the PAGs were revised further to cover terrorism involving radioactive materials.
- This includes both radiological dirty bombs (or other radiological dispersal devices, RDDs) and the exploding of a crude nuclear bomb (an IND, or improvised nuclear device).
- Today, emergency responders and government officials can use the PAGs for any radiation emergency.

How do Officials Know When it is Time to Act?

- When a radiation emergency (including a dirty bomb incident) occurs, officials will use available information and computer models to quickly predict how much radiation people could potentially receive from the incident.
- This estimate is then compared with decision levels described in the PAGs.



How do Officials Know When it is Time to Act?

- If the dose that could result from the emergency has the potential to go higher than the decision levels listed in the guidelines, the PAGs indicate what general actions can be taken to *avoid* the exposure from taking place.
- In other words, PAGs are general guidelines for deciding when specific steps are needed to *prevent* people from being exposed to a level of radiation that might be hazardous to health.

Why Not Just Carry Out Every Protective Action as Soon as a Radiation Emergency Occurs?

- Different protective actions are appropriate for different situations.
- Doing “everything at once” is not possible. For example, people cannot take shelter (stay indoors) and evacuate at the same time.

Why Not Just Carry Out Every Protective Action as Soon as a Radiation Emergency Occurs?

- Officials need to see what kind of threat the emergency poses to people so they can provide the best advice to people on how to protect health.

Why Don't Officials Just Automatically Tell Everyone to Evacuate?

- Evacuation is one of the two main protective actions that can be taken in the immediate hours or first few days of a radiation emergency, and sometimes it is necessary for protecting people's health.
- But there are also situations when sheltering may be a better choice for preventing or reducing radiation exposure.



Why Don't Officials Just Automatically Tell Everyone to Evacuate?

- For example, if a cloud containing radioactive particles is expected to pass over an area very soon and then leave quickly, evacuation could actually expose people to more radiation than staying indoors.
- This is because evacuation takes time, and many people might be caught outside or in their cars when the cloud passed over.

Why Don't Officials Just Automatically Tell Everyone to Evacuate?

- In such a situation, people staying indoors while the cloud passed by would be **more protected** than those caught outside trying to evacuate.
- Sheltering also has the advantage of being less disruptive than evacuation and of enabling people to stay in familiar surroundings and have ready access to communication, food, and water.

Why Don't Officials Just Automatically Tell Everyone to Evacuate?

- In some situations, evacuation may also not be practical.
- Blocked highways, for example, could make evacuation difficult.
- Severe weather at the time of the radiation emergency could also make evacuation dangerous.

Why Don't Officials Just Automatically Tell Everyone to Evacuate?

- It is also important to remember that evacuations can themselves create certain risks to people.
 - With large numbers of people suddenly taking to the highways, automobile accidents occur and people can be killed or injured.
 - Likewise, evacuations can be very difficult on people who are ill or in medical care. So, evacuations should only take place if they are necessary.



Photo: Three Mile Island. A Report to the Commissioners and the Public. NUREG/CR-1250, Volume 1. U.S. Nuclear Regulatory Commission.

Why Don't Officials Just Automatically Tell Everyone to Evacuate?

- If the risks from a protective action such as a major evacuation are greater than the risks to people from the emergency situation itself, it makes no sense to carry out the protective action.

Taking the Right Steps

- Officials using the PAGs and information about local conditions will tell the public whether evacuation, sheltering, or other steps are needed in a radiation emergency.
- Taking the correct steps is important for protecting yourself and your loved ones.

Beyond Evacuation or Sheltering, Are There Other Steps Officials Might Recommend?

- Sheltering or evacuation may be supplemented by
 - *limiting access* to (keeping people out of) the location where the emergency has taken place
 - *decontaminating people*, which means to remove any radioactive particles that may have fallen onto people's clothes, skin, or hair. Decontamination is done by having people remove their clothes and put them in a plastic bag, take a warm shower with lots of soap, wash their hair with only shampoo (no conditioner) or soap and water, and change clothes. Pets and service animals can also be decontaminated.

Beyond Evacuation or Sheltering, Are There Other Steps Officials Might Recommend?

- Actions might be taken to prevent radioactive contamination from entering the food chain.
- Officials might put special *controls on selected foods* suspected of being contaminated.
- They might also temporarily *put livestock on previously stored feed and water*, rather than allowing them go graze in potentially contaminated areas.

Beyond Evacuation or Sheltering, Are There Other Steps Officials Might Recommend?

- In situations where radioactive iodine has been released into the environment, officials may distribute something called potassium iodide, or KI, to protect people's thyroid glands.
- KI is a non-radioactive form of iodine. When it is taken, it fills the thyroid with regular (non-radioactive) iodine so that the radioactive iodine is not absorbed.
- KI only protects the thyroid and it is only useful in situations involving radioactive iodine; *it does not help in other situations. It is not an antidote to radiation.*

Beyond Evacuation or Sheltering, Are There Other Steps Officials Might Recommend?

- It is very unlikely that radioactive iodine will be released in a dirty bomb attack. So KI is unlikely to be helpful in a dirty bomb situation.
- In the rare case that radioactive iodine is released, officials will notify the public and provide instructions on what to do.
- Never take KI, and never give it to children, unless local health officials, emergency management officials, or your doctor specifically tell you it is needed.

Taking the Right Steps

- Officials using the PAGs and information about local conditions will tell the public which steps, if any, are needed.
- Taking the correct steps is important for protecting yourself and your family.

Who Decides Which Protective Actions to Recommend?

- Under the system of government and the laws we have in the U.S., states and local governments have the main responsibility for deciding upon and taking measures to protect life and health.
- This is true for all kinds of disasters, except war and declared national emergencies.

Who Decides Which Protective Actions to Recommend?

- The federal government's role in disasters is to provide assistance when it is needed.
- In a radiation emergency, state and local emergency response agencies use the PAGs developed by the federal government, along with their knowledge of local conditions, to decide when special actions are needed to avoid radiation exposure and protect people's health.

What Role Do PAGs Play in Protecting People Once the Immediate Emergency is Over?

- The steps described earlier are used to protect people in the early hours and days of a radiation emergency. (This is sometimes referred to as the *Early Phase*.)
- But once the immediate emergency has passed, officials may recommend other steps to help protect people from longer-term exposure.

What Role Do PAGs Play in Protecting People Once the Immediate Emergency is Over?

- These cover what is known as the *Intermediate Phase* (which begins as soon as the emergency has been brought under control and can last days to months) and the *Late Phase* (which involves cleanup and recovery efforts lasting months to years).

What Role Do PAGs Play in Protecting People Once the Immediate Emergency is Over?

- One such measure is *decontamination of land and property*, which involves cleaning radioactive contamination from an area so that people can reoccupy it.
- When this is not possible, another measure – *relocation* – may be required. Relocation involves moving people from an area and continuing to keep them from returning.

After a Radiological Terrorism Attack, How Do Officials Decide What Needs to Be Done to Clean Up the Area?

- For Radiological Dispersal Device (RDD) incidents, including dirty bombs, the guidance for cleanup and recovery is contained in a document issued in 2006.
- The document is entitled *Application of Protective Action Guides for Radiological Dispersal Device (RDD) and Improvised Nuclear Device (IND) Incidents*.

After a Radiological Terrorism Attack, How Do Officials Decide What Needs to Be Done to Clean Up the Area?

- The document notes that every terrorism situation will be different, with impacts potentially ranging from light contamination of a single street or building to situations involving wider destruction and contamination.
- Therefore, it makes little sense to have a “one size fits all” approach to cleanup and recovery.

After a Radiological Terrorism Attack, How Do Officials Decide What Needs to Be Done to Clean Up the Area?

- Keeping this in mind, the guidance does not include a pre-established numeric guideline for cleanup.
- Rather, the guidance takes the approach that the process of cleanup and recovery should be *community-based* and developed on an *incident-specific basis*. This is called *optimization*.

What is Optimization?

- The idea is to have all interested parties involved in the process, and to find an approach to cleanup and recovery that is best for that particular community.
- In choosing among cleanup alternatives, the decision-making process seeks to consider and balance many factors.

What is Optimization?

How Does it Work?

- **These could include:**
 - the nature of the incident
 - the areas impacted (e.g., size, location relative to population)
 - the types of contamination
 - human health
 - public welfare
 - ecological risks
 - technical feasibility
 - how effective clean-up will be
 - costs
 - potential adverse effects of clean-up activities
 - long-term effectiveness
 - potential economic effects (e.g., on residents, tourism, business, and industry) and public acceptability.

What is Optimization?

How Does it Work?

- Optimization is a process that tries to consider all of the relevant factors and to find a balance that is acceptable to a community.

Finding Out More

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Agency or Organization Information

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On the web: [www.agency.etc](#)

Telephone: 1-800-123-4567

Radiation Incident: Key Questions and Answers

This fact sheet was prepared by [AGENCY] to provide important information to the public regarding radiation emergencies. It is one in a series of fact sheets intended to answer some of people's most frequently asked questions. This particular fact sheet discusses two terms that are often used in relation to radiation emergencies: *Protective Actions* and *Protective Action Guides (PAGs)*. It also explains how agencies decide what steps the public should take in response to a radiation emergency. If you don't see your question here, or you wish additional information, please contact the web address or telephone number listed at the end of the sheet.

Topics covered in this fact sheet:

- ***What are Protective Actions?***
- ***What are Protective Action Guides (PAGs)?***
- ***How do agencies decide whether people should evacuate or stay where they are?***

Q: What is a Protective Action?

A: Protective actions are the urgent steps that people can take to protect their health and the health of loved ones in a dirty bomb incident or other radiation emergency.

The main protective actions that the public might be asked to take are evacuation or sheltering (staying inside).

Q. How do people know which steps to take?

A. Health and emergency management officials will tell the public if protective actions are needed and whether evacuation or staying inside would be more effective for avoiding radiation doses to people.

The officials make these decisions about how to protect public health by using information about local conditions and by using something called the "PAGs."

Q. What are the PAGs?

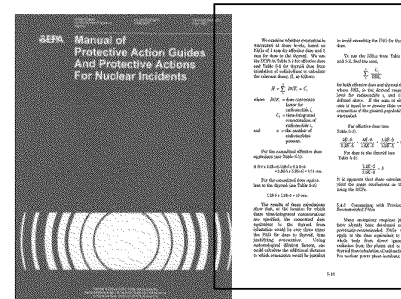
A. *PAGs, or Protective Action Guides*, are guides that were created to help officials decide when it is necessary for people to evacuate or shelter to safeguard health after a radiation emergency has occurred.

Every emergency situation is different, and the best action or set of actions in one situation may not be appropriate at another time or in another situation.

Knowing *when* emergency steps need to be taken, and *which* steps are warranted, is important for protecting the health of the public. The PAGs provide general guidance to officials, which they can use in combination with their knowledge of local conditions, to make these important decisions.

Q: What do the PAGs look like?

A: The PAGs published in 1991 were in book form, with many pages containing equations and tables with numbers developed by scientists. More recent additions to the PAGs are not in book form, but have been published instead in the *Federal Register*.



Q. What kinds of steps are included in the PAGs?

A. The PAGs include measures that government agencies and members of the public can take to protect people's health in a radiation emergency. In the first hours and days of a radiation emergency, there are two main protective actions that can be taken to avoid exposure to radiation: evacuation or sheltering.

Q. What is evacuation? What is sheltering? What is the difference?

A. *Evacuation* involves urgently moving people from an area expected to be in the path of radioactive releases.

Sheltering, on the other hand, involves having people stay indoors in their homes, offices, schools, or other buildings while radioactive materials pass over.

Q. Are there other steps officials might ask people to take?

A. Depending on the situation, evacuation or sheltering may be supplemented by other measures. One step is to limit access to (keep people out of) the affected area. Another step involves decontaminating people, which means to remove any radioactive particles that may have fallen onto people's clothes, skin, or hair. Decontamination is done by having people wash, shower, and change clothes.

Food: Sometimes officials may also take steps to stop certain foods from being consumed if the foods are suspected of being contaminated. Authorities may also act to prevent livestock from grazing in potentially-contaminated areas, and instead have the animals drink water and eat feed that has been previously stored.

Potassium Iodide: Potassium iodide, or KI, is a non-radioactive form of iodine. KI can be useful in situations where radioactive iodine has been released into the environment. It

works by filling a person's thyroid gland with safe iodine so that harmful radioactive iodine is not absorbed.

But a dirty bomb incident is very unlikely to involve radioactive iodine, so taking KI in that situation would not be helpful.

In the unlikely event that authorities do determine that radioactive iodine is involved, they will alert the public, distribute potassium iodide, and provide instructions.

Never take KI and never give to your children unless you have been specifically advised to do so by the health department, emergency management officials, or your doctor.

Q. How do officials know when it is time to carry out protective actions?

A. When a radiation emergency occurs, officials will use available information and computer models to quickly predict how much radiation people could *potentially* receive from the incident.

They then use the PAGs to determine what general actions can be taken to *avoid* that potential exposure from taking place.

In other words, PAGs are general guidelines for deciding when specific steps are needed to *prevent* people from being exposed to a level of radiation that might be hazardous to health.

Q. Wouldn't it make more sense to carry out all of the protective actions right away, as soon as a radiation emergency occurs?

A. No. Different safety measures are used for different situations.

Taking all of the safety measures at once is not possible. For example, people cannot stay inside and evacuate at the same time. Officials need to see what kind of threat the emergency poses to people so they can provide the best advice on how to protect health.

Q. Why don't officials just automatically advise everyone to evacuate when a radiation emergency occurs?

A. There are situations when sheltering may be a better choice for preventing or reducing radiation exposure.

For example, if a cloud containing radioactive particles is expected to pass over an area very soon and then leave quickly, evacuation could actually expose people to more radiation than staying indoors.

This is because evacuation takes time, and many people might be caught outside or in their cars when the cloud passed over. So people staying indoors while the cloud passed by would be more protected than those caught outside trying to evacuate.

Also, in some situations, evacuation may not be practical. Blocked highways, for example, could make evacuation difficult. So, too, could severe weather.

Officials using the PAGs and information about local conditions will tell the public whether evacuation, sheltering or other steps are needed in a radiation emergency. Follow the instructions so that you take the right steps to protect yourself and your loved ones.

Q. Who uses the PAGs?

States and local governments have the main responsibility for taking measures to protect life and health.

In a radiation emergency, state and local emergency response agencies use the PAGs to decide when special actions are needed to avoid radiation exposure and protect people's health.

Q. Do PAGs play a role in protecting people after the immediate emergency is over?

Yes. The steps described earlier are used to protect people in the early hours and days of a radiation emergency. (This is sometimes referred to as the Early Phase.)

But once the immediate emergency has passed, officials may recommend other steps to help protect people from longer-term exposure.

These cover what is known as the Intermediate Phase (which begins as soon as the emergency has been brought under control and can last days to months) and the Late Phase (which involves cleanup and recovery efforts lasting months to years).

One such measure is *decontamination of land and property*, which involves cleaning radioactive contamination from an area so that people can reoccupy it. When this is not possible, another measure – *relocation* – may be required. Relocation involves moving people from an area and continuing to keep them from returning. An additional protective action may involve placing continuing *controls on food and water*.

Q. Where can I find out more about more?

We are strongly committed to keeping the public informed and to answering people's questions. If you want to learn more, or did not see your question here, please contact us on the web at www.agency.etc or by telephone: [INSERT AGENCY CONTACT NUMBER HERE]

Radiological Terrorism Incident:

Question and Answer Guide

Impacted Community: Immediate Actions

What has happened?

An explosion has occurred at [Location] in [City].

Police, firefighters, and other emergency responders are now on the scene.

[First reports indicate that there are casualties.]

[Emergency responders have also detected radiation in the area close to the explosion site.]

Law enforcement agencies suspect the explosion was the result of a dirty bomb, which combines regular explosives such as dynamite with radioactive powder, liquid, pellets, or other materials.

Was this an atomic bomb?

No, this was not atomic bomb.

The situation we are facing involves a dirty bomb, which is completely different from an atomic bomb.

A dirty bomb does not cause a nuclear blast (the so-called mushroom cloud) and a dirty bomb affects a much smaller area than an atomic bomb.

A dirty bomb cannot cause the kind of massive, area-wide destruction and huge numbers of fatalities associated with an atomic bomb.

But this is still a very serious situation, especially very close to where the dirty bomb explosion took place.

What are the main dangers from the bombing incident?

The main and most immediate danger from a dirty bomb is from the explosion itself.

When the dynamite or other explosive used in the bomb goes off, it can destroy or damage nearby buildings and vehicles and injure or kill people.

The radioactive materials used in a dirty bomb would probably not create enough radiation exposure to cause immediate serious illness, except to people who are very close to the site of the explosion.

However, the radioactive dust and smoke that are released into the air can be hazardous to people's health if it is breathed in.

Because of this, it is important for you to take the steps listed below to protect yourself and your loved ones.

What steps should I take to protect myself and my loved ones?

There are a few simple steps — recommended by doctors, scientists, and health experts — that will help protect you and your loved ones.

- outside and near the explosion
- inside a building near the explosion
- in a car or other vehicle in the vicinity of the explosion
- farther away

IF YOU ARE OUTSIDE AND CLOSE TO WHERE THE EXPLOSION TOOK PLACE

- **Cover your nose and mouth.** Covering your nose and mouth with a cloth reduces the risk of breathing in radioactive dust or smoke. You may also use a disposable respirator such as an N95 mask if one is immediately available.
- **Don't touch** objects or pieces thrown off by an explosion — they could be radioactive.
- **Go inside and stay inside.** Quickly go into a building where the walls and windows have not been broken. This will help shield you from any radiation that might be outside.
- **Remove your outer clothes.** Once you are inside, carefully take off your outer layer of clothing. This is done in case any radioactive dust has fallen onto your clothes while you were outside.

Carefully removing outer clothes can get rid of up to 90% of radioactive dust.

- Place the clothes in a plastic bag if one is available. Put the cloth you used to cover your mouth in the bag, too. Seal the bag. Place the bag away from people and pets and keep it until authorities tell you what to do with it.
- **Wash off.** If available, take a warm shower with lots of soap. Do not scald or scratch your skin. Wash your hair only with shampoo or soap and water.

Don't use conditioner because it can cause the radioactive dust to stick to your hair.

Children should be given a shower or washed under supervision of a parent or other adult.

- If you cannot shower, use a wipe or clean wet cloth to wipe skin that was not covered by clothing (such as your hands and face).
- Gently blow your nose and gently wipe your eyelids, eyelashes, and ears with a clean wet cloth.
- Put on clean clothes. Clothing stored in a closet or away from radioactive material is clean. If you do not have clean clothes, carefully brush off your outer layer of clothing and get dressed again.
- **Tune in.** Tune to local radio or television news or government emergency management websites for more instructions.

IF YOU ARE IN A BUILDING CLOSE TO WHERE THE EXPLOSION TOOK PLACE

- **Stay inside.** If the walls and windows of the building are not broken, stay in the building and do not leave.
- **Close doors and windows.** To keep radioactive dust or powder from getting inside, shut all windows, outside doors, and fireplace dampers. It is not necessary to put duct tape or plastic sheets around doors or windows.

Temporarily turn off fans, and heating and air-conditioning systems that bring in air from the outside. In-room fans (for example, ceiling fans) that only recirculate air are okay to use. Air conditioning systems in large buildings can be used if they are set on recirculate.

- If the walls and windows of the building are broken, go to an inside room and do not leave. If the building has been heavily damaged, quickly go into another building where the walls and windows have not been broken.

- **If you have to go outside, be sure to cover your nose and mouth with a cloth.** Once you are inside, take off your outer layer of clothing and seal it in a plastic bag if available. Store the bag where others will not touch it.
- **Shower or wash** with soap and water, removing any remaining dust. Be sure to wash your hair with shampoo or soap, but remember not to use conditioner, since it can cause radioactive dust to stick to your hair.
- **Tune in.** Tune to local radio or television news or government emergency management websites for more instructions.

IF YOU ARE IN A CAR OR TRUCK WHEN THE EXPLOSION TAKES PLACE

- **Shut the windows and vents.** Close the windows and turn off the fan, air conditioner or heater if weather conditions permit. Otherwise, set the fan, air conditioner or heater on recirculate.
- **Cover your nose and mouth.** Cover your nose and mouth with a cloth to avoid breathing radioactive dust or smoke.
- If you are close to your home, office, or a public building, go there immediately and go inside quickly.
- If you cannot get to your home or another building safely, pull over to the side of the road and stop in the safest place possible. Turn off the engine and stay in the car until you are told it is safe to get back on the road.

If it is a hot or sunny day, try to stop under a bridge or in a shady spot so you and your passenger don't overheat.

- **Tune in.** Listen to the car radio for more instructions.

IF YOU ARE IN A POTENTIALLY-AFFECTED COMMUNITY BUT ARE NOT NEAR THE EXPLOSION

- **Go inside and stay inside.** Go inside your home, office, school or other building.

The wind can sometimes carry small amounts of radioactive dust from the site of a dirty bomb explosion. As a precaution, people should stay indoors for their personal safety until authorities say it is okay to leave.

- **Tune in.** Tune to the local radio or television station, or check government emergency management websites, for more instructions.

Potassium Iodide (KI): Important Information

Should my family take potassium iodide?

Never take potassium iodide (also known as KI) and never give to your children unless you have been specifically advised to do so by the health department, emergency management officials, or your doctor.

What is potassium iodide? How does it work?

Potassium iodide is a non-radioactive form of iodine.

KI can be useful in situations where hazardous radioactive iodine has been released into the environment.

KI works by filling a person's thyroid gland with safe iodine so that the harmful radioactive iodine in the environment is not absorbed.

But a dirty bomb incident is very unlikely to involve radioactive iodine. So taking KI in that situation would not be helpful.

You should only take potassium iodide if you have been specifically advised to do so by local public health officials, emergency management officials, or your doctor.

Do dirty bombs release radioactive iodine?

For various technical reasons, particularly the short amount of time it stays radioactive, radioactive iodine is not considered something terrorists are likely to use in a dirty bomb.

It is unlikely that a "dirty bomb" will release radioactive iodine.

Do not take KI unless local health officials, emergency management officials, or your doctor specifically tell you it is needed.

Will potassium iodide protect me from radiation?

Potassium iodide only protects the thyroid gland from radioactive iodine. It does not provide protection from any other kind of radiation exposure.

Potassium iodide pills are not "radiation antidotes." Potassium iodide should *only* be taken if there is a specific public health recommendation to do so.

Are over-the-counter medicines that contain iodine, such as disinfectants or throat sprays, a good substitute for potassium iodide?

No. Doing so will not protect your thyroid and could even be dangerous to your health.

It is true that many over-the-counter medicines contain iodine in some form. Examples include iodine liquid for cuts and sores, disinfectants, and throat sprays.

But these should never be taken as a substitute for potassium iodide.

These over-the-counter medicines and products are not intended for internal use. They may contain other ingredients that can be harmful.

Also, the amount of iodine contained in most of these products is small and would have no protective effect against radioactive iodine.

What about taking household disinfectants or antiseptics that contain iodine? Are these a good substitute for potassium iodide?

No. Doing so will not protect your thyroid and could even be dangerous to your health.

It is true that some household products such as disinfectants and sterilizing solutions may contain iodine.

But they are not meant to be taken internally. Drinking or consuming them could poison you.

Is taking large amounts of iodized salt a good substitute for potassium iodide?

No. Doing so will not protect your thyroid. Furthermore, although most people don't realize this, it could even be dangerous.

It is true that iodized salt contains small quantities of iodine. But the iodine content in iodized salt is too low to prevent uptake of radioactive iodine.

Furthermore, it is actually dangerous to consume large amounts of iodized salt.

The main ingredient in salt -- sodium chloride -- can make people very ill if taken in large amounts.

Even tablespoons of salt taken repeatedly over a short period of time can cause poisoning. Eating large amounts of salt can also cause high blood pressure and other medical problems.

Are herbs or herbal products a good substitute for potassium iodide?

No. Doing so will not protect your thyroid and could even be dangerous to your health.

It is true that some herbs and herbal products may contain iodine.

But the amount of iodine is not regulated, so it is not possible to know how much iodine you will be getting.

Taking large amounts of herbs or herbal products could endanger your health.

Do people need a prescription to obtain potassium iodide?

The government stockpiles potassium iodide for emergency uses.

If public health and emergency management officials determine that taking potassium iodide would be helpful, the pills will be provided to people at no charge.

But a dirty bomb situation is very unlikely to involve radioactive iodine.

Should people take potassium iodide because of the dirty bomb?

Do not take potassium iodide unless you have been advised to do so by your public health and emergency management agencies or your doctor.

Potassium iodide is unlikely to be helpful in a dirty bomb situation because a dirty bomb is unlikely to contain radioactive iodine.

Never consume iodine solution, disinfectants, cleaning products, or other over-the-counter medications or products as a substitute for KI; do not take large quantities of salt as a substitute for KI.

Taking such products will not protect your thyroid and could even be very dangerous to your health and the health of your loved ones.

Follow the advice and recommendations of public health and emergency management officials and your doctor.

Additional Information: Situation Specifics

Where should I go for information about the situation?

Tune in your local radio or television station, or check government emergency management websites, for additional information.

Public health and emergency management officials will be providing regular updates.

You can also go to the following website or toll-free hotline for information:

www.agency.etc

1-800-123-4567

I am seeing a lot of information and instructions about what to do on internet blogs. Should I follow it?

Blogs, social media, and the internet more generally can be a useful source of information, but only if the source is known and trustworthy.

Unfortunately, we know from past disasters and emergencies that small numbers of individuals may use the situation to distribute false information. And even well-intentioned individuals can pass on incorrect information or rumors.

Therefore, it is advisable to double-check what you are reading with the information and instructions being provided by the official website listed above, the official toll-free hotline, or local radio and television broadcasts.

In an emergency, get information from reliable sources so that you can protect your health and the health of loved ones.

I received a text message giving me instructions on what to do. How do I tell if it is an official message or a fake?

Unfortunately, we know from past disasters and emergencies that small numbers of individuals may use the situation to send out official-looking false information. And, as noted earlier, even well-intentioned individuals can pass on incorrect information or rumors.

If the government has issued an emergency text message, it will clearly identified as coming from [INSERT INFORMATION]. That is, the sender will read [INSERT INFORMATION].

If you are unsure about a message, double check what you are reading with the information and instructions being provided by the official website or the official toll-free hotline.

www.agency.etc

1-800-123-4567

What has happened?

An explosion has occurred at [Location] in [City].

Law enforcement agencies suspect the explosion was the result of a dirty bomb, which combines regular explosives such as dynamite with radioactive powder, liquid, pellets, or other materials.

[First reports from the scene indicate that there are casualties.]

[Emergency responders have also detected some radiation in the area close to the explosion site.]

Was this an atomic bomb?

No, this was not atomic bomb.

The situation here involves a dirty bomb, which is completely different from an atom bomb.

An atomic bomb, like those bombs dropped on Hiroshima and Nagasaki during World War Two, involves the splitting of atoms and a huge release of energy that produces the atomic mushroom cloud. Atom bombs can create immense destruction over a significant portion of a city.

A dirty bomb is different. A dirty bomb uses dynamite, plastic explosive, fertilizer, or other regular explosives to destroy nearby buildings and to scatter radioactive dust, smoke, or other material into the surrounding area.

A dirty bomb *cannot create an atomic blast*. A dirty bomb is much less destructive and affects a much smaller area than an atomic bomb.

How serious is the situation?

A dirty bomb is far less destructive than an atomic bomb.

But this is still a very serious situation, especially for people very close to where the explosion took place.

Where did the dirty bomb come from?

Early indications are that this was a deliberate [terrorist] attack using a dirty bomb.

Law enforcement and other agencies are using all available means to determine who is responsible for this attack.

How large was the explosion?

It is too early to know the exact size of the explosion. But buildings located near the explosion site have been damaged, and people have been [injured, killed].

This is a very serious situation and authorities are responding with every resource they can.

How many people have been injured or killed?

At this time, we do not yet know the specific number of casualties. An update will be provided as soon as reliable information becomes available.

Right now, we are focused on getting help to people in the affected area as quickly and safely as possible.

How much damage has there been?

First reports from the scene indicate that the explosion has caused serious damage to buildings located very close to [LOCATION].

In addition, there is some damage to nearby [CHOOSE AS APPROPRIATE roads, public transportation, communication, electricity, water pipes, communication systems].

As you would expect, our first priority is on helping people who have been injured and on protecting the health of the community.

As soon as it is possible, steps will be taken to restore damaged systems and services.

What types of radioactive material were spread due to the dirty bomb explosion?

First responders at the scene have detected [radiation / type of radionuclide if known].

[However, it is possible that additional radioactive materials could be involved.]

But regardless of the specific radioactive materials involved, the best way to protect yourself and your loved ones is to follow the instructions issued by health and emergency management officials.

Where is the radioactive material located?

Radiation and environmental health experts are checking air, water, and ground conditions in and around the explosion site to determine the precise locations of hazardous areas.

Where is the radioactive dust and smoke from the dirty bomb going?

According to current weather predictions, the areas [DIRECTION] of [CITY] could be in the path of the cloud containing the radioactive dust and smoke.

Until advised otherwise, people in neighborhoods and communities that could potentially be in this path should stay indoors.

What is a plume?

Officials sometimes call the cloud of smoke and radioactive dust moving away from the explosion a plume.

Could there be more dirty bomb explosions in our area or elsewhere?

At this time, we have no information to indicate that additional attacks are being planned.

[At this time, we do not know whether additional terrorist attacks are being planned.]

But we are taking all possible security precautions to protect the American people.

As a nation, we must continue to be alert. If you see something, say something.

If you see anything suspicious, contact your local police or the FBI right away.

Be sure to stay tuned to local radio or television news, or check government emergency management websites, for updates.

What are emergency responders doing at this time?

Emergency responders, radiation experts, scientists, and representatives from all levels of government are working together to protect the public and save lives.

Law enforcement is working to apprehend those responsible for this despicable act.

How can people learn about the safety of their family members?

If phone lines or other communication infrastructure has been damaged in the bombing, or if the lines are clogged, you may not be able to complete a phone call. Use text messages instead to try and reach your family members.

If you have access to a computer or a web-enabled device, use e-mail, social media websites like Facebook and Twitter, or online registries such as the Red Cross Safe and Well website.

Emergency responders are gathering and organizing all vital information available. If you are separated from your children or loved ones, search online for registries where people can identify themselves and their location.

Bear in mind that it may take time for registries to put in the latest information.

You can seek additional information and counseling services at [LIST ORGANIZATIONS or LOCATIONS].

What will happen to people in the affected neighborhoods?

While it is too early to know the specific impacts, we know that this is a serious incident. Lives have been lost, people have been injured, and homes and businesses have been destroyed.

All levels of government are coordinating their efforts to do everything possible to help the people affected by this emergency.

As life-saving activities continue, follow the instruction of emergency responders. These instructions are for your safety and the well-being of your loved ones.

These instructions are based on the best information we have right now.

These instructions may be updated as more information is available.

How can the public help?

Your help is vital in this situation.

Here are six important steps you can take to help:

- Do not abandon your car on the road. Instead, park your car without impeding traffic. This will allow responders to help people in need of assistance.
- Do not go near the site of the dirty bomb explosion. It could put you in danger and also stop emergency responders from doing their jobs.
- Use text messaging rather than phone calls to communicate with friends and family. This will help to keep the phone lines from overloading.
- Don't go to the hospital, police stations, or fire stations unless you were injured in the explosion, or have another medical emergency requiring immediate treatment. These facilities need to be available for victims in serious need of assistance.
- Stay alert: If you see anything suspicious, contact your local police or the FBI right away.
- Stay tuned to television, radio, and government emergency management websites for updates.

Additional Information: Health and Safety Issues

What are the immediate dangers to health?

The most immediate danger is close to the site of the explosion. Buildings are damaged, there is a great deal of glass and debris on the ground, and there may be fires burning.

Emergency responders are working to rescue individuals who are trapped and to care for people who have been hurt.

Do not approach the area of the explosion.

Follow the safety instructions provided by emergency response officials.

What are the dangers from radiation?

The main and most immediate danger from a dirty bomb is from the explosion, which can cause property damage, serious injuries, and deaths.

The radioactive materials used in a dirty bomb would probably not create enough radiation exposure to cause immediate serious illness, except possibly very close to where the bomb went off.

However, the radioactive dust and smoke spread by the bomb could travel farther away. Breathing them could be hazardous to health.

Because radiation cannot be seen, smelled, or tasted, you should take immediate steps to protect yourself and your loved ones.

How should I protect myself if I am outside in the area where the explosion occurred?

If you are outside and close to the site of the explosion, cover your nose and mouth with a cloth to avoid breathing smoke or other contaminants.

Don't touch objects or pieces thrown off by an explosion—they could be radioactive.

Go inside a building where the walls and windows have not been broken. This will help shield you from any radiation that might be outside.

Remove your outer clothes and wash off. Take a warm shower with lots of soap. Do not scald or scratch your skin.

Wash your hair with shampoo or soap and water. Do not use conditioner because it can cause radioactive dust to stick to your hair.

If you cannot shower, use a wipe or clean wet cloth to wipe skin that was not covered by clothing (such as your hands and face).

Put on clean clothes and tune to local radio or television for further instructions.

How should I protect myself if I am in a building close to where the explosion took place?

If the walls and windows of the building are intact, stay inside.

If the walls and windows of the building are broken, go to an inside room and do not leave. If the building has been heavily damaged, quickly go into another building where the walls and windows have not been broken.

Close doors and windows to keep radioactive dust or powder from getting inside,

Temporarily turn off fans, and heating and air-conditioning systems that bring in air from the outside. In-room fans (for example, ceiling fans) that only recirculate air are okay to use. Air conditioning systems in large buildings can be used if they are set on recirculate.

Tune in. Tune to local radio or television news, or check government emergency management websites, for more instructions.

What should I do if I come across an object from the explosion that might be radioactive?

Do not approach, pick up, or touch debris or other objects thrown off by the dirty bomb explosion. Especially in the immediate vicinity of the explosion, they could be radioactive.

If people are told by health and emergency management officials to self-decontaminate, what does this mean?

It means that people are being told to take several easy steps to remove any radioactive material that might have fallen onto clothes, skin, or hair.

To self-decontaminate: (1) remove your outer clothes; (2) place the clothes in a plastic bag, seal the bag, and put it someplace away from children and pets; (3) take a warm shower with lots of soap; do not scald or scratch your skin; (4) wash your hair with

shampoo or soap and water. Do not use conditioner because it can cause radioactive dust to stick to your hair; (5) if you cannot shower, use a wipe or clean wet cloth to wipe skin that was not covered by clothing (such as your hands and face); (6) put on clean clothes.

If people have been told to stay inside and self-decontaminate during a radiation emergency, what should be done about pets? How do I decontaminate my pet?

If your pet was outside at the time of the explosion, the pet can be brought inside and decontaminated.

Start by putting on waterproof gloves and a dust mask (or other material to cover your mouth).

Also, keep cuts and scrapes (yours and on your pet) covered to keep radioactive material out of any wounds.

Then wash your pet carefully in a shower or bath using shampoo or soap and water. Rinse the pet completely.

To make sure you have not picked up any contaminants, be sure to shower, and wash your hands and face, after you have washed the pet.

Will people who have been exposed to the radioactive dust and smoke get cancer?

Just because a person is near a radioactive source for a short time or gets a small amount of radioactive dust on himself or herself does not mean he or she will get cancer later in life, especially if it is removed quickly.

Except very close to the site of the incident, the radiation doses are expected to be low.

Exposure at the low radiation doses expected from a dirty bomb could increase the risk of cancer slightly over naturally occurring rates.

Scientists and health experts are working now to gather information on the radiation risks posed by the attack.

Meanwhile, health agencies will be establishing screening centers to check people for radioactive contamination and to arrange for any longer-term follow-up should it be needed.

Further information on this will be provided soon by health and emergency management officials.

Should I take potassium iodide (KI)?

Potassium iodide is unlikely to be helpful in a dirty bomb incident.

You should only take potassium iodide if you have been specifically advised to do so by local public health or emergency management officials.

How do I know if I've been exposed to radiation or contaminated by radioactive materials?

People cannot see, smell, feel, or taste radiation; so you may not know whether you have been exposed.

In addition, low levels of radiation exposure (like those expected from a dirty bomb situation) do not cause any symptoms.

Police or firefighters will quickly check for radiation by using special equipment to determine how much radiation is present and whether it poses any danger in your area.

Is the food safe to eat?

Food in sealed containers and any unspoiled food in your refrigerator or freezer are safe to eat.

Use a damp towel or cloth to wipe off cans, bottles, packaged foods, counters, plates, pots and utensils before using them.

Seal these towels or cleaning cloths in a plastic bag and place them away from people and pets.

However, any unpackaged food that was out in the open and close to the incident may have radioactive dust on it. Therefore, do not consume food that was out in the open.

Food that was outdoors from *[time]* today, within a few miles of *[explosion site]* should be avoided.

Is the water safe to use?

Bottled water and sealed juice or soda containers will be free of radioactive contamination. But wipe or rinse the outside of bottles or cans before opening them.

Water from the tap is probably safe. But until we have drinking water test results, only bottled water is certain to be free of contamination. Tap or well water can be used for cleaning yourself and your food.

Boiling tap water does not get rid of radioactive material.

Is pet food safe for my pet?

As with human food, sealed pet food is safe for animals to consume.

As with human food, rinse or wipe off any debris from a closed can or package with tap water and dispose the washcloth in a plastic bag away from people and animals.

Is radiation contagious?

Unlike some biological agents, radiological effects are not contagious and cannot result in an epidemic.

It is true that people who have radioactive dust on their clothes or their bodies can leave some of that contamination on things or people they come into contact with.

But there is a simple solution: to have them clean up or decontaminate.

People who might have radioactive dust on them can remove their outer layer of clothing, shower, and put on new clothes.

Is it safe for me to let someone who might have been affected by the dirty bomb into my home?

Even if someone has radioactive dust on his or her clothes or body, a few simple steps can clean up or decontaminate the person so that he or she can safely visit your home.

First, ask your visitor to remove his or her outer layer of clothing and place it in a plastic bag. Place the bag away from people and pets.

Second, have your visitor shower with soap and warm water to remove any remaining radioactive material. A warm shower with lots of soap is sufficient. There is no need to use very hot water or to scratch the skin.

Hair may be washed with shampoo or soap and water. But don't use conditioner because it can cause the radioactive dust to stick to your hair.

Gently blow your nose and gently wipe your eyelids, eyelashes, and ears with a clean wet cloth.

Finally, put on clean clothes.

Special Issues and Concerns:

Pregnancy and Breastfeeding

I am pregnant. Do I need to terminate my pregnancy because of the incident?

After any radiation incident, expectant mothers who have concerns should seek advice from their physicians working in consultation with radiation professionals.

Unfortunately, after some radiation accidents in other countries, pregnant women reportedly terminated their pregnancies because they feared that the radiation would harm the developing embryo or fetus. Tragically, these terminations turned out to be totally unnecessary.

It is true that the fetus is extremely sensitive to radiation, with the unborn child at greatest risk during the first trimester of the pregnancy. But as the Centers for Disease Control and Prevention (CDC) has noted, most radiation exposure events will not expose the fetus to levels likely to cause health effects.

In the case of a dirty bomb, the majority of people in the general area of the incident would only be exposed to low levels of radiation. In general, this situation is unlikely to expose the fetus to levels associated with health effects.

However, for any pregnant woman who was very close to the site of the explosion, significantly higher levels of contamination on the body or inside the body could result in higher exposure levels.

Before any potential health risk to the embryo/fetus can be assessed, healthcare professionals and radiation experts would determine what external or internal doses the mother might have received as a result of being very close to the explosion.

Once dose levels to the mother and fetus have been determined, your physician working in conjunction with other medical and radiation professionals can discuss potential risks (if any) and provide appropriate counseling.

Is it safe to breastfeed?

Breastfeeding is very important for the well-being of a baby, providing vital nutrients and a sense of security.

For mothers far from the explosion site, breastfeeding can continue.

However, if a mother was close to the explosion site and was either injured or is believed to have inhaled significant quantities of radioactive dust or smoke, there is a small possibility that some radioactivity could be passed through breast milk.

Public health and medical officials may advise the mother to temporarily stop breastfeeding and switch to either breast milk that was pumped and stored before the incident or baby formula until she is able to contact her doctor or public health and medical officials for further instructions or advice.

Formula containers and feeding supplies should be cleaned with a damp cloth or clean towel before use. Put the used cloth or towel in a plastic bag or other sealable container and place the bag in an out-of-the-way place, away from other people and pets.

If no other source of food is available, continue to breastfeed. Wash the nipple and breast thoroughly with soap and warm water before nursing.

Can pregnant women take potassium iodide pills?

As with the rest of the population, pregnant women should take potassium iodide only when specifically advised to by public health authorities.

Potassium iodide will cross the placenta and protect the thyroid of the growing fetus, as well as the mother.

Can breastfeeding women take potassium iodide?

As with the rest of the population, breastfeeding women should take potassium iodide tablets only when specifically advised by public health authorities.

However, this will not be sufficient to fully protect the breastfed child. The child will also need potassium iodide in special doses adapted for newborns and infants.

I am trying to get pregnant. Should I worry that my future children will be affected?

There is no evidence that your future children will be at a greater risk for birth defects or other problems. Over many years, extensive studies of the children of atomic bomb survivors have been conducted by scientists. There has been no indication of genetic effects in the offspring of people who survived the atomic bombings and later had children.

Special Issues and Concerns: Children

What should I do about my children and family? Should I leave to find my children?

If your children or family are with you, stay together. Take the same actions to protect your whole family.

If your children or family are in another home or building, they should stay there until you are told it is safe to travel.

Schools have emergency plans and shelters. If your children are at school, they should stay there until it is safe to travel.

Do not go to the school until public officials say it is safe to travel.

What is being done to protect children in school?

Children in schools will be cared for by teachers and staff until such time as it is safe for them to leave. Children will not be released to go outside until instructed to do so by health officials and emergency responders.

Schools have emergency plans in place to protect the children. These plans include keeping everyone inside and providing assistance for those with special needs.

If some of the radioactive dust got on my clothes or skin, will I contaminate my child? Is it safe for me to be around my child?

Radioactive dust can be removed by taking off and bagging your outer layer of clothing, showering with soap and warm water, and putting on clean clothes.

People who have cleaned up pose no contamination risk to you, your property, or the members of your household.

If people need to be decontaminated at a reception center or other location, will I be able to stay with my children when they are decontaminated?

Children and their families (parents or caregivers) should not be separated unless there are critical medical issues that need to be addressed.

Parents should be able to stay with their children during decontamination and other processes.

Does my child need to have his/her thyroid scanned?

Thyroid scans are only needed in situations where there is a possibility that radioactive iodine has entered the body.

It is very unlikely that a dirty bomb would involve radioactive iodine, so a thyroid scan would probably not be useful.

In the very unlikely case that radioactive iodine is detected at the dirty bomb site, public health officials will immediately notify doctors and the public and provide information about thyroid protection.

What kind of emotional impact can a radiological terrorism incident have on children? What should I look out for?

Children are among the most vulnerable of those affected by a radiological terrorism incident because they lack the maturity, skills, and experience to fully understand and process what is going on.

Family members and caregivers should gently try to find out what the child thinks and feels about the disaster.

If the child is scared because she/he has misunderstood what has happened, then simple explanations should be provided while avoiding alarming details.

Children who exhibit signs of stress such as difficulty sleeping, loss of appetite, or bedwetting should receive extra time and attention from family members and other caregivers.

It is important to remember that children also need a chance to play and relax.

Encourage older children to be helpful and maintain regular routines.

Are children at higher risk of harm if exposed to radiation?

Children exposed to radiation may be at greater risk than adults.

Children have higher breathing rates, are growing, and have physical proximity to the ground—where agents may be more concentrated—which makes them more vulnerable. Young children are also very sensitive to radioactive iodine.

To protect children, and avoid radiation exposure, follow the instructions issued by health officials and emergency responders.

Will my child and I get cancer from the dirty bomb?

There are many causes of cancer, some genetic and some from the environment.

For some people, it is possible that the low levels of radiation expected from a dirty bomb could slightly increase the risk of cancer over what occurs naturally in a person's lifetime.

But first, it is very important to remember that being at the site where a dirty bomb exploded does not automatically mean that someone came into contact with radioactive material.

Healthcare providers and other specialists are screening people and their belongings with sensitive radiation detection devices to find out if someone came into contact with radioactive materials thrown off by the bomb. The special instruments used to detect radiation are very sensitive, so radioactive contamination is easily detected if it is present.

Second, even if someone was exposed to radiation, it does not necessarily mean that a person will have any negative health effects.

Just because a person is near a radioactive source for short time, inhales a small amount of radioactive dust, or gets a small amount of radioactive material on clothing or skin, it does not automatically mean he or she will get cancer later in life.

Scientists, doctors, and other health experts are working now to check people and gather information on any potential radiation risks posed by the attack. Once exposure information has been gathered, health officials and your doctor will be able to discuss possible risks (if any) and the practical steps you can take to reduce them.

Should my children take potassium iodide?

It is unlikely that radioactive iodine will be released in a dirty bomb situation.

If health authorities do advise that potassium iodide needs to be taken by the public in an affected area, children can do so unless they have known allergies to iodine.

However, the doses and procedures for giving KI to children are not the same as for an adult.

If potassium iodide is needed, health authorities will provide specific guidance on dosages and procedures for giving KI to children.

Special Issues and Concerns:

People with Disabilities or Special Medical Needs

If I go through decontamination at a reception center or other facility, will my eyeglasses have to be taken away?

Eye glasses may be washed in the shower with the person who wears them.

Your glasses should not be taken away.

I have a prosthetic limb. If I have to be decontaminated to remove radioactive dust, will my prosthetic limb have to be taken away?

Most prosthetic limbs can get wet.

So they can be removed, thoroughly cleaned along with the person, and put back on.

There is no reason for a prosthetic limb to be taken away.

Is there a general list of the kinds of devices, adaptive equipment, prostheses, and mobility aids that can be decontaminated?

Unfortunately, there is no single guide currently available that covers all situations.

However, a general list was published in 2006 by the New York Center for Terrorism Planning and Preparedness (NYCTP) in a document on hospital decontamination protocols.

The list identifies the following items that can be decontaminated: non-electric wheelchairs, prosthetic limbs (w/o leather components), walkers, crutches (w/o foam cushions/parts), canes (w/o foam cushions/parts), eyeglasses, and prosthetic eyes.

Items that cannot be decontaminated, or that pose special challenges, include mechanical ventilators, electric wheelchairs, hearing aids, contact lenses, and any leather attachments/components of items.

For such items, discuss options with emergency responders and health officials.

What if my service animal is found to be contaminated?

Animals that provide critical support to humans (for example, seeing eye dogs) and are known or suspected to be contaminated will be decontaminated.

In 2006, the PETS Act (Pets Evacuation and Transportation Standards Act) was created to ensure that state and local emergency management partners address the specific needs of individuals with service animals. Provisions for decontamination of service animals are included in the law.

How are service animals decontaminated?

Most animals can be decontaminated by simply using a soap and water solution.

For sensitive areas around the animal's eyes, nose, mouth, and in ears, where traditional washing methods may be more difficult, moist towlettes may be utilized.

In some situations, emergency responders may also place a muzzle on the animal to prevent it from licking or drinking contaminated water.

What should people do if they do not have life-sustaining medications?

If you are in the area affected by the dirty bomb and your life is in danger because you are running out of life-sustaining medication such as insulin or heart medicine, take the following steps to get medication and avoid any radioactive contamination that might be outside:

- Call 911 if possible.
- Seek help from a neighbor.
- As a last resort, you can go to the closest medical facility.
- If you must go outside, remember to clean yourself thoroughly when you come back inside.
- Remove the outer layer of clothes, shower and wash with soap and warm water, and put on clean clothes.

I have been having radiation treatments for medical reasons. Should I stop my treatments because I might have been exposed to radiation from the dirty bomb?

Doctors sometimes recommend the use of radiation therapy to treat certain types of cancer. The medical treatment radiation is used in an effort to target the tumor without harming nearby healthy cells.

As a general rule, there is no reason for a dirty bomb situation to cause people to stop or take a break from potentially life-saving medical treatments.

However, it is possible the dislocation or emotional stress from the dirty bomb situation could leave some people very tired and less able to deal with the side effects of medical radiation therapy.

If this is the case, you should discuss this with your doctor to jointly decide the best course of action.

To: Wieder, Jessica[Wieder.Jessica@epa.gov]
Cc: Nesky, Anthony[Nesky.Tony@epa.gov]; DeCair, Sara[DeCair.Sara@epa.gov]; White, Rick[White.Rick@epa.gov]
From: Becker, Steven M.
Sent: Wed 2/10/2016 5:00:56 PM
Subject: RE: PAGs Messages

Hi Jess,

Yes, absolutely, I would be happy to do so.

I will send the entire folder (suite of materials) later today.

All the best,

Steve

-----Original Message-----

From: Wieder, Jessica [mailto:Wieder.Jessica@epa.gov]
Sent: Wednesday, February 10, 2016 11:27 AM
To: Becker, Steven M.
Cc: Nesky, Anthony; DeCair, Sara; White, Rick
Subject: RE: PAGs Messages

Hi Steve,

I hate to be a pain, but can you send me ALL of the Q&As in a word file. These would include the messages for special populations and the dirty bomb specific questions. I want whatever we put out to include all of the specialized messages that don't exist anywhere else just yet.

Thank you!

Jess

Jessica Wieder
U.S. EPA
Radiation Protection Program
Center for Radiation Information and Outreach
w: 202-343-9201
c: 202-420-9353

From: Becker, Steven M. [smbecker@odu.edu]
Sent: Monday, February 1, 2016 9:21 AM
To: Wieder, Jessica
Cc: Nesky, Anthony; DeCair, Sara; White, Rick
Subject: RE: PAGs Messages

Hi Jess,

Good morning! Attached please find the PAGs materials in accessible formats. There are three files:

1. The full PAGs Q&A (WORD file)
2. An abbreviated PAGs Q&A (WORD file)

3. The PAGs slide deck (Powerpoint)

If you need anything else, please don't hesitate to contact me.

All the best,

Steve

From: Wieder, Jessica [mailto:Wieder.Jessica@epa.gov]
Sent: Monday, February 01, 2016 7:23 AM
To: Becker, Steven M.
Cc: Nesky, Anthony; DeCair, Sara; White, Rick
Subject: RE: PAGs Messages

Steve - I appreciate the help. As soon as you can get me the materials, we can start working on them.

Jessica

Jessica Wieder
U.S. EPA
Radiation Protection Program
Center for Radiation Information and Outreach
w: 202-343-9201
c: 202-420-9353

From: Becker, Steven M. [mailto:smbecker@odu.edu]
Sent: Friday, January 29, 2016 2:41 PM
To: Wieder, Jessica <Wieder.Jessica@epa.gov<mailto:Wieder.Jessica@epa.gov>>
Subject: RE: PAGs Messages

Sorry it has taken so long... it has just been nutso busy around here.

From: Wieder, Jessica [mailto:Wieder.Jessica@epa.gov]
Sent: Friday, January 29, 2016 2:40 PM
To: Becker, Steven M.
Subject: Re: PAGs Messages

Thank you!
Jessica Wieder
U.S. Environmental Protection Agency
Radiation Protection Program
202-343-9201
m: 202-420-9353

Sent from my iPhone

On Jan 29, 2016, at 2:25 PM, Becker, Steven M. <smbecker@odu.edu<mailto:smbecker@odu.edu>>
wrote:
Found the materials... stay tuned.

-----Original Message-----

From: Becker, Steven M.
Sent: Tuesday, January 26, 2016 1:57 PM
To: 'Wieder, Jessica'
Subject: RE: PAGs Messages

Hi Jess,

The snowstorm ended up being fun for us. Norfolk only got 2-3 inches of snow between the two bands that affected the area. So we had enough for snowballs and snowmen but not so much as to be a pain. (It was also merciful for the storm not to be too bad. I was too jet-lagged to deal with more than a little bit of shoveling!)

Yikes, I cannot believe how much snow DC and surrounding areas received! I hope the situation has at least given you some pretty scenes to view and some nice, relaxing family time to enjoy.

Re: the PAGs messages -- That is terrific! I am glad EPA will be able to make use of some of the content. I will go the archive later today, get the original WORD files out, and send them to you.

Stay safe!

All the best,

Steve

-----Original Message-----

From: Wieder, Jessica [mailto:Wieder.Jessica@epa.gov]

Sent: Tuesday, January 26, 2016 7:20 AM

To: Becker, Steven M.

Subject: PAGs Messages

Hi Steve,

I hope you made it back from your travels before the storm. How did you and your family weather the storm? After not seeing a plow since 7 pm on Friday, my street banded together yesterday and hand shoveled 30 inches of snow from the court to the main street. It was a truly impressive act of a community working together. We will have a problem if two cars are headed in different directions, but at least we have a way out if we need it.

When you get a chance, can you please send me an editable version of the PAGs messages? We briefed our management and EPA is going to take the lead on publishing the Q&As. Some will go on the web as FAQs and some will end up in a PAG Manual Communications Implementation Tool.

Thank you.

Jess

Jessica Wieder
U.S. EPA
Radiation Protection Program
Center for Radiation Information and Outreach
w: 202-343-9201
c: 202-420-9353

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BEGIN-ANTISPAM-VOTING-LINKS

Teach CanIt if this mail (ID 03QgErsom) is spam:

Spam: <https://www.spamtrap.odu.edu/canit/b.php?i=03QgErsom&m=297fff251916&t=20160210&c=s>

Not spam:

<https://www.spamtrap.odu.edu/canit/b.php?i=03QgErsom&m=297fff251916&t=20160210&c=n>

Forget vote:

<https://www.spamtrap.odu.edu/canit/b.php?i=03QgErsom&m=297fff251916&t=20160210&c=f>

END-ANTISPAM-VOTING-LINKS

To: Becker, Steven M.[smbecker@odu.edu]
Cc: Nesky, Anthony[Nesky.Tony@epa.gov]; DeCair, Sara[DeCair.Sara@epa.gov]; White, Rick[White.Rick@epa.gov]
From: Wieder, Jessica
Sent: Wed 2/10/2016 4:26:51 PM
Subject: RE: PAGs Messages

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Radiation Protection Program
Center for Radiation Information and Outreach
w: 202-343-9201
c: 202-420-9353

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c: 202-420-9353

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Jessica Wieder
U.S. Environmental Protection Agency
Radiation Protection Program
202-343-9201
m: 202-420-9353

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Thank you.

Jess

Jessica Wieder
U.S. EPA
Radiation Protection Program
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w: 202-343-9201
c: 202-420-9353

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BEGIN-ANTISPAM-VOTING-LINKS

NOTE: This message was trained as non-spam. If this is wrong, please correct the training as soon as possible.

Teach CanIt if this mail (ID 01QaAkHnP) is spam:Spam: about:blankNot spam: about:blankForget
vote: about:blank

END-ANTISPAM-VOTING-LINKS

Spam<<https://www.spamtrap.odu.edu/canit/b.php?i=03Qd0n3m6&m=8ccff4584794&t=20160201&c=s>>
Not
spam<<https://www.spamtrap.odu.edu/canit/b.php?i=03Qd0n3m6&m=8ccff4584794&t=20160201&c=n>>
Forget previous
vote<<https://www.spamtrap.odu.edu/canit/b.php?i=03Qd0n3m6&m=8ccff4584794&t=20160201&c=f>>

To: Nesky, Anthony[Nesky.Tony@epa.gov]; DeCair, Sara[DeCair.Sara@epa.gov]; White, Rick[White.Rick@epa.gov]
From: Wieder, Jessica
Sent: Wed 2/10/2016 3:02:46 PM
Subject: RE: FAQs Round 2
WebFAQs-PAGS+jw=SD=RW (2) jw.docx

I few minor edits. Tony, this is excellent. You will see that my comments are just compliments. Nicely done!

I am working on the PAGs Implementation Communication Tool today.

Jess

Jessica Wieder
U.S. EPA
Radiation Protection Program
Center for Radiation Information and Outreach
w: 202-343-9201
c: 202-420-9353

From: Nesky, Anthony
Sent: Monday, February 8, 2016 7:24 PM
To: Wieder, Jessica; DeCair, Sara; White, Rick
Subject: FAQs Round 2

Here are the revised FAQs. Text we added on the phone is in green. New text or edited text is in redline/strikeout. We may need to discuss the question about the basis.

Tony Nesky
Center for Radiation Information and Outreach
Tel: 202-343-9597
nesky.tony@epa.gov<mailto:nesky.tony@epa.gov>

To: DeCair, Sara[DeCair.Sara@epa.gov]
From: Favret, Derek
Sent: Tue 2/9/2016 12:36:28 PM
Subject: RE: PAG Manual for FRPCC review - cmts due 2/19

Sara,

Yes, please add me to the list with Ed.

Thanks.

Derek

From: DeCair, Sara [mailto:DeCair.Sara@epa.gov]
Sent: Monday, February 08, 2016 3:30 PM
To: Favret, Derek <Derek.Favret@Hq.Doe.Gov>
Subject: Fw: PAG Manual for FRPCC review - cmts due 2/19

Derek, is it safe to assume I should put you on the PAGs Subcommittee of the FRPCC list in place of Carlos?

Sara

From: DeCair, Sara
Sent: Monday, February 8, 2016 3:27 PM
To: Amy Doll; Andrew.Wallo@eh.doe.gov; asa4@cdc.gov; ben.cacioppo@dtm.mil; Carlos.Corredor@Hq.Doe.Gov; Edward.Regnier@hq.doe.gov; John.Jensen@dm.usda.gov; john.mackinney@dhs.gov; john.madrid@dtm.mil; lee.a.nickel1@navy.mil; lodwick.jeffrey@dol.gov; michael.howe@fema.dhs.gov; Michael.Noska@fda.hhs.gov; Patricia.Milligan@nrc.gov; paul.ward@fema.dhs.gov; ricardo.a.reyes@us.army.mil; siddhanti@endyna.com; tdkraus@sandia.gov; Veal, Lee; Wieder, Jessica; william.cunningham@nist.gov
Cc: olin.hale@fema.dhs.gov
Subject: PAG Manual for FRPCC review - cmts due 2/19

FRPCC Colleagues;

Attached you will find (finally!) our proposed public-comments-in version of the PAG Manual. This includes work we've done together on clarifying and explaining what we meant as a PAGs Subcommittee, and you'll see other tweaks and improvements to make the guidance more complete. This version does contain placeholders for the drinking water guidance to drop in, once public review of that is done. You'll also note, with relief I'm sure, that the changes in total are very minor. All changes from the PAG Manual issued for comment in 2013 are highlighted for you.

Since the changes are minor, we're looking for your comments within two weeks (due date: Feb. 19, 2016). Comments in the form of Page Number, Paragraph Number, Suggestion & Rationale are preferred to making a redline strikeout of the Manual document itself, but whatever works for you will work for us. Also know that formatting is still underway on this document, so if you see ways that could improve, do let me know. Please call or email anytime with questions or issues. Our next steps will be to finalize the document and prepare a proposed FR Notice for OMB review.

Thank you for your help,

Sara

Sara D. DeCair

<http://www.epa.gov/radiation/rert/pags.html>

202-343-9108

Room 1416 B in WJC West

To: DeCair, Sara[DeCair.Sara@epa.gov]; Amy Doll[adoll@endyna.com]; Andrew.Wallo@eh.doe.gov[Andrew.Wallo@eh.doe.gov]; asa4@cdc.gov[asa4@cdc.gov]; Cacioppo, Ben A Jr CIV DTRA J3-7 (US)[ben.a.cacioppo.civ@mail.mil]; Carlos.Corredor@Hq.Doe.Gov[Carlos.Corredor@Hq.Doe.Gov]; Edward.Regnier@hq.doe.gov[Edward.Regnier@hq.doe.gov]; John.Jensen@dm.usda.gov[John.Jensen@dm.usda.gov]; john.mackinney@dhs.gov[john.mackinney@dhs.gov]; john.madrid@dtra.mil[john.madrid@dtra.mil]; Nickel, Lee A CDR USN (US)[lee.a.nickel1@navy.mil]; lodwick.jeffrey@dol.gov[lodwick.jeffrey@dol.gov]; michael.howe@fema.dhs.gov[michael.howe@fema.dhs.gov]; Michael.Noska@fda.hhs.gov[Michael.Noska@fda.hhs.gov]; Patricia.Milligan@nrc.gov[Patricia.Milligan@nrc.gov]; paul.ward@fema.dhs.gov[paul.ward@fema.dhs.gov]; siddhanti@endyna.com[siddhanti@endyna.com]; tdkraus@sandia.gov[tdkraus@sandia.gov]; Veal, Lee[Veal.Lee@epa.gov]; Wieder, Jessica[Wieder.Jessica@epa.gov]; william.cunningham@nist.gov[william.cunningham@nist.gov]
Cc: olin.hale@fema.dhs.gov[olin.hale@fema.dhs.gov]
From: Reyes, Ricardo A LTC USARMY DHA DHSS (US)
Sent: Mon 2/8/2016 10:15:08 PM
Subject: RE: [Non-DoD Source] PAG Manual for FRPCC review - cmts due 2/19
[smime.p7s](#)

We see the light at the end of the tunnel.

Thank you.

Rick

LTC Ricardo Reyes, Ph.D.
Chief Health Physics/DHA Regional Radiation Health Consultant
WRNMMC
8901 Rockville Pike | Bethesda, MD 20889
NIPR: ricardo.a.reyes.mil@mail.mil
O: (301) 400-0892
BB: (202) 468-7431

-----Original Message-----

From: DeCair, Sara [mailto:DeCair.Sara@epa.gov]
Sent: Monday, February 08, 2016 3:27 PM
To: Amy Doll; Andrew.Wallo@eh.doe.gov; asa4@cdc.gov; Cacioppo, Ben A Jr CIV DTRA J3-7 (US); Carlos.Corredor@Hq.Doe.Gov; Edward.Regnier@hq.doe.gov; John.Jensen@dm.usda.gov; john.mackinney@dhs.gov; john.madrid@dtra.mil; Nickel, Lee A CDR USN (US); lodwick.jeffrey@dol.gov; michael.howe@fema.dhs.gov; Michael.Noska@fda.hhs.gov; Patricia.Milligan@nrc.gov; paul.ward@fema.dhs.gov; Reyes, Ricardo A LTC USARMY DHA DHSS (US); siddhanti@endyna.com; tdkraus@sandia.gov; Veal, Lee; Wieder, Jessica; william.cunningham@nist.gov
Cc: olin.hale@fema.dhs.gov
Subject: [Non-DoD Source] PAG Manual for FRPCC review - cmts due 2/19

All active links contained in this email were disabled. Please verify the identity of the sender, and confirm the authenticity of all links contained within the message prior to copying and pasting the address to a Web browser.

FRPCC Colleagues;

Attached you will find (finally!) our proposed public-comments-in version of the PAG Manual. This includes work we've done together on clarifying and explaining what we meant as a PAGs Subcommittee, and you'll see other tweaks and improvements to make the guidance more complete. This version does contain placeholders for the drinking water guidance to drop in, once public review of that is done. You'll also note, with relief I'm sure, that the changes in total are very minor. All changes from the PAG Manual issued for comment in 2013 are highlighted for you.

Since the changes are minor, we're looking for your comments within two weeks (due date: Feb. 19, 2016). Comments in the form of Page Number, Paragraph Number, Suggestion & Rationale are preferred to making a redline strikeout of the Manual document itself, but whatever works for you will work for us. Also know that formatting is still underway on this document, so if you see ways that could improve, do let me know. Please call or email anytime with questions or issues. Our next steps will be to finalize the document and prepare a proposed FR Notice for OMB review.

Thank you for your help,

Sara

Sara D. DeCair

Caution-<http://www.epa.gov/radiation/rert/pags.html> <

Caution-<http://www.epa.gov/radiation/rert/pags.html> >

202-343-9108

Room 1416 B in WJC West

To: DeCair, Sara[DeCair.Sara@epa.gov]
From: Hale, Olin
Sent: Mon 2/8/2016 9:14:39 PM
Subject: RE: Distro to FRPCC of PAG Manual, by Olin

You are most welcome and I have both messages firmly in hand while preparing the email.

Very Best,

Olin

Olin Hale

DHS-FEMA-NPD-THD-PSI

Mobile: (202) 341-8643

email: olin.hale@fema.dhs.gov

From: DeCair, Sara [mailto:DeCair.Sara@epa.gov]
Sent: Monday, February 08, 2016 4:11 PM
To: Hale, Olin
Subject: Re: Distro to FRPCC of PAG Manual, by Olin

You're wise to get clarity. I do want review, and yes, comments too. Please do send on my behalf. Thanks!!

From: Hale, Olin <olin.hale@fema.dhs.gov>
Sent: Monday, February 8, 2016 4:09 PM
To: DeCair, Sara
Subject: RE: Distro to FRPCC of PAG Manual, by Olin

Sara, thank you for the kind words. Between getting Mr. Hoyer and some changes we've also made in THD I'm hoping for a good year for FRPCC.

Now I can't leave you without asking a not-too-bright question: we do wish to ask for review and comment? Also, may I send on your behalf (as opposed to being directly on behalf of the generic FRPCC)?

Thanks again,

Olin

Olin Hale

DHS-FEMA-NPD-THD-PSI

Mobile: (202) 341-8643

email: olin.hale@fema.dhs.gov

From: DeCair, Sara [mailto:DeCair.Sara@epa.gov]
Sent: Monday, February 08, 2016 4:05 PM
To: Hale, Olin
Cc: Veal, Lee

Subject: Re: Distro to FRPCC of PAG Manual, by Olin

Olin, that is great -- all the things you mentioned! A new director for you and a broad distribution for the PAG Manual. Thank you so much,

Sara

From: Hale, Olin <olin.hale@fema.dhs.gov>

Sent: Monday, February 8, 2016 3:43 PM

To: DeCair, Sara

Subject: RE: March FRPCC Meeting Save-the-Date: March 23rd 1000-13000h: 1800 S. Bell Street, 8th floor, Room 803. December 3rd Meeting Minutes Attached

Sara,

Well, looking at your document with changes, I believe it should go to the full membership. The PAGs are quite important and I see some interesting subject-matter, including the ever popular KI section.

I've created two lists for FRPCC, a Member list that includes the agencies required by 44 CFR and a 'Participants' list to include everyone else we invite, including administrative personnel and the like. I don't suppose it would hurt to send to both groups rather than inadvertently leaving out an interested party.

My excuse for the delay is that we have a new THD Director, who will also be our new FRPCC Co-Chair. I am travelling to ORNL tomorrow but hope to brief him up on my return, and begin discussing FRPCC topics, including yours. Our new Director is Jonathan Hoye, former FEMA deputy Administrator.

So I would be glad to send your notes out, the timing is indeed perfect!

Very Best Regards,

Olin

PS: Please let me know how much time you would like on the March agenda.

Olin Hale

DHS-FEMA-NPD-THD-PSI

Mobile: (202) 341-8643

email: olin.hale@fema.dhs.gov

From: DeCair, Sara [mailto:DeCair.Sara@epa.gov]

Sent: Monday, February 08, 2016 1:16 PM

To: Hale, Olin

Subject: Re: March FRPCC Meeting Save-the-Date: March 23rd 1000-13000h: 1800 S. Bell Street, 8th floor, Room 803. December 3rd Meeting Minutes Attached

Olin, this note from you is very timely. I'd like to send out the PAG Manual for FRPCC review today, and I wanted to check with you on the best way to do that.

I have a PAG Subcommittee distribution, and I can send it to that list, plus you. Then see if your leadership thinks the Manual should also go to the full list, or not. I could see benefit, but also potential confusion on what's being asked of the reviewers. In fact, the document has holes, or placeholders, in it where the drinking water proposal would drop in after we get it out for public review. In the interest of speeding this to OMB to get it out before the end of the administration, though, we are doing concurrent processes.

Let me know if you or your bosses have strong feelings about how broadly to send this out, and I'll cc you on my note the PAG Subcommittee in just a few minutes.

Thanks!

- Sara

From: Hale, Olin <olin.hale@fema.dhs.gov>

Sent: Monday, February 8, 2016 12:51 PM

To: Hutter, Adam; Remick, Alan; Scott, Andrew; Armin Ansari; Barbara Stunder; Ben Cacioppo; Stevenson, Benjamin; Bernard Bogdan; Webb, Bill; Blizzard, Jeffrey; Blumenthal, Daniel; Bob Stephan (robertbstephan@aol.com); Bruce Young; byw3@cdc.gov; Carla Boyce; Celia, Matthew; Gorman, Chad; Wood, Chad; Christine Martin; Gregg, Chuck; Burnside, Conrad; Crawford, Sean; Cullen, William R; Dean McCauley; Dennis Emmert (dennis.j.emmert.mil@mail.mil); Eberst, William; Elaine Bond; Feighert, Dan; FladeboeJP@state.gov; Foreman, Bruce; Fox, Kathleen (Katie) M; Garcia, Luis; Gardner, Patricia; Gordon Cleveland; Greten, Timothy; Hammond, Lisa; Sherwood, Harry; Heath, Stanley; Hoyes, Jonathan; Jacqueline.mann@nist.gov; James Williams; Kish, James; Jeffery Albanus; Jeffrey Sincek; 'Jensen, John (USDA)'; Patterson, James L; Jim Stahlman (James.e.stahlman.civ@mail.mil); John F. Koerner (John.Koerner@hhs.gov); John Madrid; MacKinney, John A; John.Sokich@noaa.gov; Brinsfield, Kathryn; Kennedy, Beth D CTR OSD OUSD POLICY (US); McDaniel, Kenneth L CIV; Kgeiss@ostp.eop.gov; Veal, Lee; Lee.a.nickel1@navy.mil; lodwick.jeffrey@dol.gov; McCarroll, Janis; michael.collins2@ic.fbi.gov; michael.noska@fda.hhs.gov; Mike.Wangler@em.doe.gov; Monchek, Rafaela; Monchek, Rafaela; Musick, David; OLeary, Sean; Hale, Olin; pxm@nrc.gov; Grundstrom, Richard; Robert Stephan; Robert Whitcomb; Lewis, Robert; Washington, Russell; Sally Billings; DeCair, Sara; Scardino, Thomas; Overby, Stacey; Colman, Steve; steven.fine@noaa.gov; Quinn, Vanessa; Wieder, Jessica; Billado, William; Alvin Morris; Andrew Wallo; Bennett, Gerilee; Blunt, Kenyetta; Bobbitt, Sharon; Schlieger, Brian; Carrington, Jessica; Chacko, Betsie; Chase, Stephen; Coleman-Hansberry, Brenda; Collins, Richard; Coons, Albert; DeFelice, Anthony; Dozor, Joshua; Echevarria, Sharon; Gearing, Alexis; Alexis; Glenn-Graves, Precilla (CTR); Harris III, Timothy; Hart, Hampton; Howe, Michael; Jackson, Liz; Jason.kozal@nrc.gov; Snead, Kathryn; Ken Lauziere; Kenneth Inn; Laurence Broun; Lisa Karam; Nanko, Lisa; Mark Russo; Ward, Paul; Perry, April; Pesapane, Robert; Phillips, Marlene; Ricardo Reyes; Collins, Richard; Robert Prins; Sabata, Andrew; Schafer, John; Stewart-Smith, Mart A (Stewart-SmithMA@state.gov); Tagliento, Marc

Subject: March FRPCC Meeting Save-the-Date: March 23rd 1000-13000h: 1800 S. Bell Street, 8th floor, Room 803. December 3rd Meeting Minutes Attached

Good Afternoon FRPCC Members and Colleagues,

You are cordially invited to participate in the next quarterly meeting of the Federal Radiological Preparedness Coordinating Committee that will be held:

Wednesday, March 23rd 2016 from 10:00 AM to 1:00 PM.

Location: we are returning to **1800 S. Bell Street, 8th floor, Room 803.**
Further details and directions will be included with the calendar invitation.

-
- A draft agenda is being prepared and we welcome your topics and suggestions for consideration. A calendar invitation and a formal call-for-topics will be sent in the near future.
 - Attached are the minutes from the December 3rd quarterly meeting: your comments and revisions are welcome.
 - Also, as an administrative note, James Purvis and Matt Celia are currently on FEMA details so Mr. Jeff Blizzard and I will continue to be the points of contact for regular FRPCC matters.
-

Please feel free to contact me and/or Mr. Blizzard at any time for questions, comments, and new FRPCC initiatives.

Very Best Regards,

Olin

Olin T. Hale, PPS

FRPCC Section Chief

Professional Services and Integration
Technological Hazards Division
Federal Emergency Management Agency
U.S. Department of Homeland Security
202.341.8643

email: olin.hale@fema.dhs.gov

To: DeCair, Sara[DeCair.Sara@epa.gov]
From: Perrin, Alan
Sent: Fri 2/5/2016 10:23:47 PM
Subject: RE: This is just a few of the 999 versions I have...

Nope, this is all the excitement I can handle for the weekend! Thank you, Alan

Alan Perrin, Deputy Director
Radiation Protection Division, USEPA
ofc (202) 343-9775 | mbl (202) 279-0376

From: DeCair, Sara
Sent: Friday, February 05, 2016 4:14 PM
To: Perrin, Alan <Perrin.Alan@epa.gov>
Subject: This is just a few of the 999 versions I have...

So – here is the latest Finalization doc I have (meant for other office heads), an interim step that looks like an Action Plan but doesn't have water, and the last full Action Plan that I had from October. The dates have been adjusted each time, most recently for the other offices -- to tighten up all steps but theirs ☺

Let me know if you want the other 996 of them. Thanks!

Sara D. DeCair

<http://www.epa.gov/radiation/rert/pags.html>

202-343-9108

Room 1416 B in WJC West

To: DeCair, Sara[DeCair.Sara@epa.gov]
Cc: Doug Draper[chg5gb@hotmail.com]
From: Doug Draper
Sent: Fri 2/5/2016 9:11:47 PM
Subject: RE: Maybe I need your work email address?

Sara,
This looks great! Thanks so much for the prompt reply. As soon as I figure out who the HPS Program Committee Chair is, I'll get this in.

Have a great weekend!
Doug

From: DeCair.Sara@epa.gov
To: CHG5GB@hotmail.com
Subject: Maybe I need your work email address?
Date: Fri, 5 Feb 2016 20:10:27 +0000

Doug,

So glad we can work together on an HPS session! I can also emphasize the move to ICRP 60-series dosimetry and use of age groups for some of the PAGs, and not others. (Finally, right?) My 3 or 4 lines would look something like this – but I welcome any editorial suggestions or tweaks you'd like to make.

The revised PAG Manual issue for Public Comment and Interim Use in 2013 will be described in detail with emphasis on how the update was informed by the Fukushima experience. Long-awaited drinking water guidance being crafted will be discussed, as well as decisions for implementing the age groups in ICRP 60 series dosimetry that was adopted in the revision. New long term recovery guidance on setting remediation goals with community involvement and planning for unprecedented waste management challenges have been shaped by how Japan is dealing with their long term recovery process.

Here's the long version:

In 2013, the U.S. Environmental Protection Agency (EPA) proposed an update to the 1992 Protective Action Guides (PAG) Manual that provides guidance to state and local officials planning for radiological emergencies. EPA requested public comment on the proposed revisions, while making them available for interim use by officials faced with an emergency situation. Developed with interagency partners, EPA's proposal incorporates newer dosimetric methods, identifies tools and guidelines developed since the current document was issued, and extends the scope of the PAGs to all significant radiological incidents, including radiological dispersal devices or improvised nuclear devices. EPA also requested input on potential protective action guides for drinking water. New in the PAG Manual is planning guidance for the late phase of an incident, after the situation is stabilized and efforts turn toward recovery. Because the late phase can take years to complete, decision makers are faced with managing public exposures in areas not fully remediated. The proposal includes quick reference operational guidelines to inform re-entry to the contaminated zone. Broad guidance on approaches to wide-area cleanup and developing cleanup goals is also provided. EPA adapted the cleanup process from the 2008 Department of Homeland Security (DHS) "Planning Guidance for Protection and Recovery Following Radiological Dispersal Device (RDD) and Improvised Nuclear Device (IND) Incidents" and the final PAG Manual will supersede that DHS guidance. Waste management guidance is also provided. Recognizing that an incident could result in radioactive waste volumes that severely strain or exceed available resources and capacity, officials may consider alternatives for disposal of waste that is relatively lightly contaminated. Waste management, which includes treatment, staging, and interim and long-term storage, must be an integral part of recovery.

Sara D. DeCair

<http://www.epa.gov/radiation/rert/pags.html>

202-343-9108

Room 1416 B in WJC West

To: DeCair, Sara[DeCair.Sara@epa.gov]
Cc: Amy Doll[adoll@endyna.com]
From: Miguel Tuason
Sent: Thur 2/4/2016 10:15:05 PM
Subject: RE: Yours for the afternoon: new PAG Manual version
PAG Manual Revised_v050 02052016.docx

Hi Sara –

We've gone ahead and addressed most of your notes below and attached the slightly revised version on this email.

Amy and I would like to have another quick call (any time after 10am Friday) to review these changes to make sure we are on the same page, correctly addressed your notes, and get you the most solid version for your Monday review.

Thanks again.

Best

Miguel

Miguel Tuason
SR. BUSINESS DEVELOPMENT MANAGER
EnDyna, Inc.
7926 Jones Branch Drive
Suite 620
McLean, VA 22102
Tel: 703 848 8842 ext. 120
Cell: 571 218 7505
Fax: 703 848 9001
www.endyna.com

From: DeCair, Sara [mailto:DeCair.Sara@epa.gov]
Sent: Thursday, February 4, 2016 3:28 PM
To: Miguel Tuason <mtuason@endyna.com>
Cc: Amy Doll <adoll@endyna.com>
Subject: Yours for the afternoon: new PAG Manual version

Miguel,

Thanks for turning around those changes for me! I have made my changes based in internal comments, and stuck with the Gray/Yellow them for word changes (not punctuation or capitalization).

I still want to check:

- FIXED Headers late in the doc, may not be same as earlier in doc

Will you check/fix:

- DONE Check format for my references that I added (FRC, 2 of them) – I used hard returns and guessed at how to cite them properly
- OKAY QA for wording changes that snuck back in:
 - o “major facility” had become “majority facility” in 1.2
 - o “nuclear fuel manufacturing” had become “nuclear manufacturing” in the same section
- DONE Basis for Early Phase should be its own section with a section #
- OKAY Let’s make Ch. 5’s Introduction that first paragraph that used to lead with Cleanup Process – does it look okay the way I did it?
- DONE – but should discuss if we should refrain from fourth-level (1.1.1.1) sections throughout the rest of the manual (for consistency) - We need fewer sections and section #s in the 5.2.4 area – those small outline and list parts can be larger and not so numbered
- DONE For this next review I’ll be starting Monday, can you pull out most or all of the blue highlights for a clean version? (But I promise I’ll look at them to give feedback during this next review. I’ll just need reminders.)
- OKAY, FOR DISCUSSION I think in Ch. 3, the Key Points heading (we don’t have any

yet but I'd welcome your ideas for them) got mixed up in order with the last line of text and the table 3-3.

I'll be back at this about 9 am tomorrow, so let me know if any of this is indecipherable. Thank you!!

Sara

Sara D. DeCair

<http://www.epa.gov/radiation/rert/pags.html>

202-343-9108

Room 1416 B in WJC West

To: DeCair, Sara[DeCair.Sara@epa.gov]
Cc: Amy Doll[adoll@endyna.com]; siddhanti@endyna.com[siddhanti@endyna.com]
From: Miguel Tuason
Sent: Thur 2/4/2016 4:38:52 PM
Subject: RE: Couple requests on new formatted PAG Manual
PAG Manual Revised_v049 02042016.docx

Hello, Sara –

Thanks for the feedback.

Re-formatted version is attached.

The previously BURGUNDY highlights are now BRIGHT BLUE.

The page breaks for each section have been eliminated.

We look forward to receiving the next round of feedback and edits in about two weeks, and as always, please don't hesitate to give either me or Amy a call with any questions, comments, or concerns.

Best

Miguel

Miguel Tuason
SR. BUSINESS DEVELOPMENT MANAGER
EnDyna, Inc.
7926 Jones Branch Drive
Suite 620
McLean, VA 22102
Tel: **703 848 8842 ext. 120**
Cell: **571 218 7505**
Fax: **703 848 9001**
www.endyna.com

From: DeCair, Sara [mailto:DeCair.Sara@epa.gov]
Sent: Thursday, February 4, 2016 10:13 AM
To: Amy Doll <adoll@endyna.com>; Miguel Tuason <mtuason@endyna.com>
Subject: Couple requests on new formatted PAG Manual

Amy and Miguel,

I'm at the point of making a few changes based in internal review here (very minor, thank goodness) so we can get out for FRPCC interagency review of the Manual on Monday.

I wonder, can you go through and make the burgundy hilites in the TOC easier to read? And could you cut the many pages breaks that takes the page number count so high? I see it's cleaner to look at but I need it a bit shorter for people to recognize it's not so very much changed.

Let me know your time estimate on those adjustments so I can figure how best to get these changes in – that is, by me, you all, or a combo – thanks tons! I am at my desk if you'd like to discuss.

Sara D. DeCair

<http://www.epa.gov/radiation/rert/pags.html>

202-343-9108

Room 1416 B in WJC West

To: Wieder, Jessica[Wieder.Jessica@epa.gov]; DeCair, Sara[DeCair.Sara@epa.gov]
From: Nesky, Anthony
Sent: Mon 2/1/2016 4:36:11 PM
Subject: Draft FAQs for the Web Page
[WebFAQs-PAGS.docx](#)

Dear Jess and Sara:

Here are a shortened version of Dr. Becker's FAQs that I would put on the website. Your feedback is most welcome.

Tony Nesky

Center for Radiation Information and Outreach

Tel: 202-343-9597

nesky.tony@epa.gov

To: Wieder, Jessica[Wieder.Jessica@epa.gov]
Cc: Nesky, Anthony[Nesky.Tony@epa.gov]; DeCair, Sara[DeCair.Sara@epa.gov]; White, Rick[White.Rick@epa.gov]
From: Becker, Steven M.
Sent: Mon 2/1/2016 2:32:37 PM
Subject: RE: PAGs Messages

My pleasure! I am thrilled that EPA will be able to make use of some of the content.

From: Wieder, Jessica [mailto:Wieder.Jessica@epa.gov]
Sent: Monday, February 01, 2016 9:27 AM
To: Becker, Steven M.
Cc: Nesky, Anthony; DeCair, Sara; White, Rick
Subject: RE: PAGs Messages

Thank you, Steve! This is super helpful. We are going to get starting pulling these products together right away.

Jess

Jessica Wieder

U.S. EPA

Radiation Protection Program

Center for Radiation Information and Outreach

w: 202-343-9201

c: 202-420-9353

From: Becker, Steven M. [mailto:smbecker@odu.edu]
Sent: Monday, February 01, 2016 9:22 AM
To: Wieder, Jessica <Wieder.Jessica@epa.gov>
Cc: Nesky, Anthony <Nesky.Tony@epa.gov>; DeCair, Sara <DeCair.Sara@epa.gov>; White, Rick <White.Rick@epa.gov>
Subject: RE: PAGs Messages

Hi Jess,

Good morning! Attached please find the PAGs materials in accessible formats. There are three files:

1. The full PAGs Q&A (WORD file)
2. An abbreviated PAGs Q&A (WORD file)
3. The PAGs slide deck (Powerpoint)

If you need anything else, please don't hesitate to contact me.

All the best,

Steve

From: Wieder, Jessica [<mailto:Wieder.Jessica@epa.gov>]
Sent: Monday, February 01, 2016 7:23 AM
To: Becker, Steven M.
Cc: Nesky, Anthony; DeCair, Sara; White, Rick
Subject: RE: PAGs Messages

Steve – I appreciate the help. As soon as you can get me the materials, we can start working on them.

Jessica

Jessica Wieder

U.S. EPA

Radiation Protection Program

Center for Radiation Information and Outreach

w: 202-343-9201

c: 202-420-9353

From: Becker, Steven M. [<mailto:smbecker@odu.edu>]
Sent: Friday, January 29, 2016 2:41 PM
To: Wieder, Jessica <Wieder.Jessica@epa.gov>
Subject: RE: PAGs Messages

Sorry it has taken so long... it has just been nutso busy around here.

From: Wieder, Jessica [<mailto:Wieder.Jessica@epa.gov>]
Sent: Friday, January 29, 2016 2:40 PM
To: Becker, Steven M.
Subject: Re: PAGs Messages

Thank you!

Jessica Wieder

U.S. Environmental Protection Agency

Radiation Protection Program

202-343-9201

m: 202-420-9353

Sent from my iPhone

On Jan 29, 2016, at 2:25 PM, Becker, Steven M. <smbecker@odu.edu> wrote:

Found the materials... stay tuned.

-----Original Message-----

From: Becker, Steven M.
Sent: Tuesday, January 26, 2016 1:57 PM
To: 'Wieder, Jessica'
Subject: RE: PAGs Messages

Hi Jess,

The snowstorm ended up being fun for us. Norfolk only got 2-3 inches of snow between the two bands that affected the area. So we had enough for snowballs and snowmen but not so much as to be a pain. (It was also merciful for the storm not to be too bad. I was too jet-lagged to deal with more than a little bit of shoveling!)

Yikes, I cannot believe how much snow DC and surrounding areas received! I hope the situation has at least given you some pretty scenes to view and some nice, relaxing family time to enjoy.

Re: the PAGs messages -- That is terrific! I am glad EPA will be able to make use of some of the content. I will go the archive later today, get the original WORD files out, and send them to you.

Stay safe!

All the best,

Steve

-----Original Message-----

From: Wieder, Jessica [<mailto:Wieder.Jessica@epa.gov>]
Sent: Tuesday, January 26, 2016 7:20 AM
To: Becker, Steven M.
Subject: PAGs Messages

Hi Steve,

I hope you made it back from your travels before the storm. How did you and your family weather the storm? After not seeing a plow since 7 pm on Friday, my street banded together yesterday and hand shoveled 30 inches of snow from the court to the main street. It was a truly impressive act of a community working together. We will have a problem if two cars are headed in different directions, but at least we have a way out if we need it.

When you get a chance, can you please send me an editable version of the PAGs messages? We briefed our management and EPA is going to take the lead on publishing the Q&As. Some will go on the web as FAQs and some will end up in a PAG Manual Communications Implementation Tool.

Thank you.

Jess

Jessica Wieder
U.S. EPA
Radiation Protection Program
Center for Radiation Information and Outreach
w: 202-343-9201
c: 202-420-9353

--

BEGIN-ANTISPAM-VOTING-LINKS

NOTE: This message was trained as non-spam. If this is wrong, please correct the training as soon as possible.

Teach CanIt if this mail (ID 01QaAkHnP) is spam: [Spam: about:blank](#) Not spam: [about:blank](#)
Forget vote: [about:blank](#)

END-ANTISPAM-VOTING-LINKS

[Spam](#)
[Not spam](#)
[Forget previous vote](#)

To: Becker, Steven M.[smbecker@odu.edu]
Cc: Nesky, Anthony[Nesky.Tony@epa.gov]; DeCair, Sara[DeCair.Sara@epa.gov]; White, Rick[White.Rick@epa.gov]
From: Wieder, Jessica
Sent: Mon 2/1/2016 2:26:36 PM
Subject: RE: PAGs Messages

Thank you, Steve! This is super helpful. We are going to get starting pulling these products together right away.

Jess

Jessica Wieder

U.S. EPA

Radiation Protection Program

Center for Radiation Information and Outreach

w: 202-343-9201

c: 202-420-9353

From: Becker, Steven M. [mailto:smbecker@odu.edu]
Sent: Monday, February 01, 2016 9:22 AM
To: Wieder, Jessica <Wieder.Jessica@epa.gov>
Cc: Nesky, Anthony <Nesky.Tony@epa.gov>; DeCair, Sara <DeCair.Sara@epa.gov>; White, Rick <White.Rick@epa.gov>
Subject: RE: PAGs Messages

Hi Jess,

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1. The full PAGs Q&A (WORD file)

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3. The PAGs slide deck (Powerpoint)

If you need anything else, please don't hesitate to contact me.

All the best,

Steve

From: Wieder, Jessica [<mailto:Wieder.Jessica@epa.gov>]
Sent: Monday, February 01, 2016 7:23 AM
To: Becker, Steven M.
Cc: Nesky, Anthony; DeCair, Sara; White, Rick
Subject: RE: PAGs Messages

Steve – I appreciate the help. As soon as you can get me the materials, we can start working on them.

Jessica

Jessica Wieder

U.S. EPA

Radiation Protection Program

Center for Radiation Information and Outreach

w: 202-343-9201

c: 202-420-9353

From: Becker, Steven M. [<mailto:smbecker@odu.edu>]
Sent: Friday, January 29, 2016 2:41 PM
To: Wieder, Jessica <Wieder.Jessica@epa.gov>
Subject: RE: PAGs Messages

Sorry it has taken so long... it has just been nutso busy around here.

From: Wieder, Jessica [<mailto:Wieder.Jessica@epa.gov>]
Sent: Friday, January 29, 2016 2:40 PM
To: Becker, Steven M.
Subject: Re: PAGs Messages

Thank you!

Jessica Wieder

U.S. Environmental Protection Agency

Radiation Protection Program

202-343-9201

m: 202-420-9353

Sent from my iPhone

On Jan 29, 2016, at 2:25 PM, Becker, Steven M. <smbecker@odu.edu> wrote:

Found the materials... stay tuned.

-----Original Message-----

From: Becker, Steven M.
Sent: Tuesday, January 26, 2016 1:57 PM
To: 'Wieder, Jessica'
Subject: RE: PAGs Messages

Hi Jess,

The snowstorm ended up being fun for us. Norfolk only got 2-3 inches of snow between the two bands that affected the area. So we had enough for snowballs and snowmen but not so much as to be a pain. (It was also merciful for the storm not to be too bad. I was too jet-lagged to deal with more than a little bit of shoveling!)

Yikes, I cannot believe how much snow DC and surrounding areas received! I hope the situation has at least given you some pretty scenes to view and some nice, relaxing family time to enjoy.

Re: the PAGs messages -- That is terrific! I am glad EPA will be able to make use of some of the content. I will go the archive later today, get the original WORD files out, and send them to you.

Stay safe!

All the best,

Steve

-----Original Message-----

From: Wieder, Jessica [<mailto:Wieder.Jessica@epa.gov>]

Sent: Tuesday, January 26, 2016 7:20 AM

To: Becker, Steven M.

Subject: PAGs Messages

Hi Steve,

I hope you made it back from your travels before the storm. How did you and your family weather the storm? After not seeing a plow since 7 pm on Friday, my street banded together yesterday and hand shoveled 30 inches of snow from the court to the main street. It was a truly impressive act of a community working together. We will have a problem if two cars are headed in different directions, but at least we have a way out if we need it.

When you get a chance, can you please send me an editable version of the PAGs messages? We briefed our management and EPA is going to take the lead on publishing the Q&As. Some will go on the web as FAQs and some will end up in a PAG Manual Communications Implementation Tool.

Thank you.

Jess

Jessica Wieder
U.S. EPA
Radiation Protection Program
Center for Radiation Information and Outreach
w: 202-343-9201
c: 202-420-9353

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BEGIN-ANTISPAM-VOTING-LINKS

NOTE: This message was trained as non-spam. If this is wrong, please correct the training as soon as possible.

Teach CanIt if this mail (ID 01QaAkHnP) is spam:Spam: [about:blank](#)Not spam:

[about:blank](#)Forget vote: [about:blank](#)

END-ANTISPAM-VOTING-LINKS

[Spam](#)

[Not spam](#)

[Forget previous vote](#)

To: Wieder, Jessica[Wieder.Jessica@epa.gov]
Cc: Nesky, Anthony[Nesky.Tony@epa.gov]; DeCair, Sara[DeCair.Sara@epa.gov]; White, Rick[White.Rick@epa.gov]
From: Becker, Steven M.
Sent: Mon 2/1/2016 2:21:48 PM
Subject: RE: PAGs Messages
[2 - PAGs Protect Q&As - Full.docx](#)
[4 - PAGs Protect Q&As - Brief.docx](#)
[3 - PAGs Protect Slide Deck.ppt](#)

Hi Jess,

Good morning! Attached please find the PAGs materials in accessible formats. There are three files:

1. The full PAGs Q&A (WORD file)
2. An abbreviated PAGs Q&A (WORD file)
3. The PAGs slide deck (Powerpoint)

If you need anything else, please don't hesitate to contact me.

All the best,

Steve

From: Wieder, Jessica [mailto:Wieder.Jessica@epa.gov]
Sent: Monday, February 01, 2016 7:23 AM
To: Becker, Steven M.
Cc: Nesky, Anthony; DeCair, Sara; White, Rick
Subject: RE: PAGs Messages

Steve – I appreciate the help. As soon as you can get me the materials, we can start working on them.

Jessica

Jessica Wieder

U.S. EPA

Radiation Protection Program

Center for Radiation Information and Outreach

w: 202-343-9201

c: 202-420-9353

From: Becker, Steven M. [<mailto:smbecker@odu.edu>]
Sent: Friday, January 29, 2016 2:41 PM
To: Wieder, Jessica <Wieder.Jessica@epa.gov>
Subject: RE: PAGs Messages

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To: Becker, Steven M.
Subject: Re: PAGs Messages

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Jessica Wieder

U.S. Environmental Protection Agency

Radiation Protection Program

202-343-9201

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as soon as possible.

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[about:blank](#) Forget vote: [about:blank](#)

END-ANTISPAM-VOTING-LINKS

[Spam](#)
[Not spam](#)
[Forget previous vote](#)

Protective Actions and Protective Action Guides (PAGs): Questions and Answers

Q: What is a Protective Action?

A: *Protective actions* are the urgent steps that people can take to protect their health and the health of loved ones in a dirty bomb incident or other radiation emergency.

The main protective actions that the public might be asked to take are evacuation or sheltering (staying inside).

Q. How will people know what to do?

A. Health and emergency management officials will tell the public if protective actions are needed and whether evacuation or staying inside would be more effective for avoiding radiation doses to people.

The officials make these decisions about how to protect public health by using information about local conditions and by using something called the “PAGs.”

Q. What does “PAGs” stand for?

A. The abbreviation “PAGs” is short for *Protective Action Guides*.

Q. What are Protective Actions Guides?

A. *Protective Action Guides*, or *PAGs*, are guides that help officials decide when it is necessary for people to evacuate, stay inside or take other urgent steps to safeguard health in a radiation emergency.

Every emergency situation is different, and the best action or set of actions in one situation may not be helpful at another time or in another situation.

Knowing *when* emergency steps need to be taken and *which* steps are warranted is very important for protecting the health of the public.

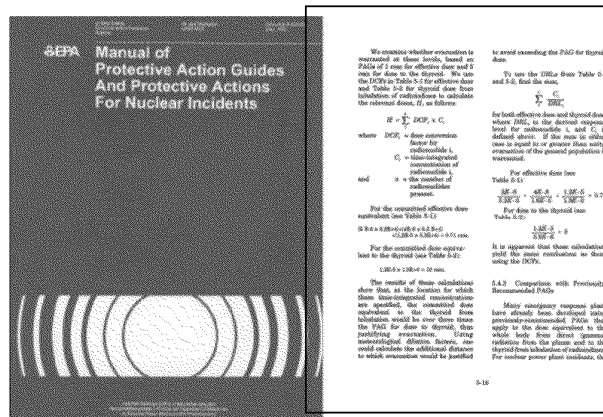
The PAGs provide general guidance to officials, which they can use together with their knowledge of local conditions, to make these important decisions.

Q: What do the PAGs look like?

A: The Manual of Protective Action Guides developed in 1991 was actually a book.

Much of it consists of pages with equations and tables with numbers developed by scientists.

More recent additions to the PAGs are not in book form, but have been published instead in the *Federal Register*.



Q. What kinds of steps are included in the PAGs?

A. The PAGs include actions that government agencies and members of the public can take to protect people's health in a radiation emergency.

In the first hours and days of a radiation emergency, there are two main protective actions that the public might be asked to take to avoid exposure to radiation: evacuation or sheltering (staying inside).

Q. What is evacuation? What is sheltering? What is the difference?

A. *Evacuation* involves quickly moving people from an area expected to be in the path of radioactive releases.

Sheltering, on the other hand, involves having people stay indoors in their homes, offices, schools or other buildings while radioactive materials pass over.

Q. Are there other steps officials might ask people to take?

A. Depending on the circumstances, other actions may also sometimes be helpful for protecting health.

For example, evacuation or sheltering could be supplemented by *limiting access* to (keeping people out of) the location where the emergency has taken place. Another step is *decontaminating people*, which means to remove any radioactive particles that may have fallen onto people's clothes, skin, or hair. Decontamination is done by having people wash, shower, and change their clothes.

Q. What about controls on food?

A. In some situations, officials may determine that it is necessary to take actions to prevent radioactive contamination from entering the food chain.

Steps might involve preventing livestock from grazing in potentially-contaminated pastures or fields and ensuring that animals only eat feed and drink water that has been previously stored.

When necessary, officials may also act to stop certain foods from coming to market or limit consumption of human food if it is suspected of being contaminated.

Q. What about taking Potassium Iodide?

A. Never take potassium iodide (also known as KI) and never give to your children unless you have been specifically advised to do so by the health department, emergency management officials, or your doctor.

Potassium iodide is a non-radioactive form of iodine.

KI can be useful in situations where radioactive iodine has been released into the environment.

It works by filling a person's thyroid gland with safe iodine so that harmful radioactive iodine in the environment is not absorbed.

But KI is only useful in situations involving radioactive iodine, and it only protects the thyroid gland; it does not help in other situations involving radioactive releases.

A dirty bomb situation is very unlikely to involve radioactive iodine.

You should only take potassium iodide if you have been specifically advised to do so by local public health officials, emergency management officials, or your doctor.

Q. How do officials know when it is time to carry out protective actions?

A. When a radiation emergency occurs, officials will use available information and computer models to quickly predict how much radiation people could potentially receive from the incident.

This estimate is then compared with decision levels described in the PAGs.

If the dose that could result from the emergency has the potential to go higher than the decision levels listed in the guidelines, the PAGs list what general actions can be taken to *avoid* the exposure from taking place.

In other words, PAGs are general guidelines for deciding when specific steps are needed to *prevent* people from being exposed to a level of radiation that might be hazardous to health.

Q. Wouldn't it make more sense to carry out all of the protective actions right away, as soon as a radiation emergency occurs?

A. No. Different safety measures are used for different situations.

Trying to take all of the measures at once would not be possible and could actually cause confusion or even harm.

For example, people cannot take shelter and evacuate at the same time.

Officials need to see what kind of hazard the emergency poses to people so they can provide the best advice on how to protect health.

Q. Why don't officials just automatically advise everyone to evacuate when a radiation emergency occurs?

A. Evacuation is one of the two main protective actions that can be taken in the immediate hours or first few days of a radiation emergency, and sometimes it is necessary for protecting people's health.

But there are also situations when sheltering may be a better choice for preventing or reducing radiation exposure.

For example, if a cloud containing radioactive particles is expected to pass over an area very soon and then leave quickly, evacuation could actually expose people to more radiation than staying indoors.

This is because evacuation takes time, and many people might be caught outside or in their cars when the cloud passed over.

So in such a situation, officials might ask people to stay indoors.

Buildings, such as large offices and structures made from brick, can provide significant protection from radiation.

So people staying indoors while the cloud passed by would be more protected than those caught outside trying to evacuate.

Sheltering also has the advantage of being less disruptive than evacuation and of enabling people to stay in familiar surroundings and have access to food, water, and information sources such as television or radio. So in some circumstances, it may be better than evacuating.

Watch or listen to official announcements to learn what steps you should take.

Q. Are there situations when evacuation might not be appropriate, or might even be harmful?

A. Yes. In some situations, evacuation may not be practical.

Blocked highways, for example, could make evacuation difficult.

Severe weather at the time of the radiation emergency could also make evacuation dangerous.

It is also important to remember that evacuations can themselves create certain risks to people.

With large numbers of people suddenly taking to the highways, automobile accidents occur and people can be killed or injured. Other vehicles may run out of gas and get stuck.

Evacuations can also be very difficult on people who are ill or in medical care. So, evacuations should only take place if they are necessary.

If the risks from a protective action such as a major evacuation are greater than the risks to people from the emergency situation itself, it makes no sense to carry out this protective action.

Officials using the PAGs and information about local conditions will tell the public whether evacuation, sheltering, or other steps (e.g., avoiding certain foods) are needed in a radiation emergency.

Q. What kinds of radiation emergencies are the PAGs used for?

A. When the U.S. Environmental Protection Agency (EPA) was created in 1970, it was given responsibility for developing PAGs. The first Protective Action Manual, which was published in 1975, focused only on accidents at commercial nuclear power plants.

But in 1991 the Protective Action Guides were revised and expanded to cover all types of peacetime radiation emergencies.

The 1991 revisions also included recommendations from the U.S. Food and Drug Administration (FDA) for protective actions if an incident causes contamination of food or animal feed.

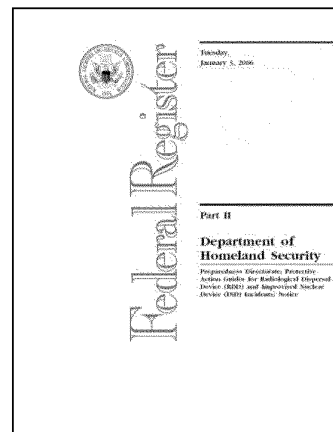
In addition, the 1991 Manual added guidance from the FDA and FEMA on the use of KI, potassium iodide, in situations involving the release of radioactive iodine.

Among the many possible situations covered in the 1991 PAGs were accidents involving U.S. nuclear power plants, accidents involving foreign nuclear reactors where the U.S. is affected, incidents involving the transportation of radioactive materials, satellite incidents, and incidents at nuclear research facilities, manufacturing or scrap metal recycling facilities, or hospitals.

More recently, in 2006, the PAGs were revised further to cover terrorism involving radioactive materials.

This includes both radiological dirty bombs (or other radiological dispersal devices, RDDs) and the exploding of a crude nuclear bomb (an IND, or improvised nuclear device).

Today, emergency responders and government officials can use the PAGs for any radiation emergency.



Q. Who uses the PAGs?

In a radiation emergency, federal, state and local emergency response agencies use the PAGs to decide when special actions are needed to avoid radiation exposure and protect people's health.

Under the system of government and the laws we have in the U.S., states and local governments have the main responsibility for deciding upon and taking measures to protect life and health.

The federal government's role in disasters is to provide assistance when it is needed.

This is true for all kinds of disasters, except war and declared national emergencies.

Q: What is the purpose of the PAGs?

A: At the most fundamental level, the purpose of the PAGs is to protect people's health.

By providing guidelines on when it is time to take protective actions, and which protective actions are best, the PAGs help prevent immediate effects and reduce the risk of longer-term effects from a radiation emergency.

The PAGs are also designed to ensure that any protective action taken does more good than harm.

Q: Are the PAGs federal standards?

A: Although the PAGs are not federal standards, they were developed by federal agencies to provide helpful guidance to state and local agencies.

The PAGs recommend precautions that state and local authorities can take during an emergency to keep people from receiving an amount of radiation that might be hazardous to their health.

State and local agencies use the PAGs, along with their knowledge of local conditions, to make decisions on how best to safeguard the population.

Q: What is the difference between a Protective Action and a PAG?

A: Protective actions are the specific steps that can be taken to avoid or reduce radiation dose. Evacuation and sheltering are examples of Protective Actions.

The PAGs are guides that tell officials when it is time to carry out protective actions and which steps are appropriate.

Q. Do the PAGs play a role in protecting people once the immediate emergency is over?

Yes. The steps described earlier are used to protect people in the early hours and days of a radiation emergency. (This is sometimes referred to as the *Early Phase*.)

But once the immediate emergency has passed, officials may recommend other steps to help protect people from longer-term exposure.

These cover what is known as the *Intermediate Phase* (which begins as soon as the emergency has been brought under control and can last days to months) and the *Late Phase* (which involves cleanup and recovery efforts lasting months to years).

One such measure is *decontamination of land and property*, which involves cleaning radioactive contamination from an area so that people can reoccupy it.

When this is not possible, another measure – *relocation* – may be required. Relocation involves moving people from an area and continuing to keep them from returning.

An additional protective action may involve placing continuing *controls on food and water*.

Q. What is the difference between evacuation and relocation?

Evacuation involves temporarily moving of people out of an area to protect them from short-term, high-level exposure to radiation, with the intention of having them return later.

Relocation involves moving people out of a contaminated area for a much longer time (or in some situations perhaps even permanently), in order to avoid chronic or long-term radiation exposure.

Q. After a terrorist attack that spreads radioactive contamination, how do officials figure out how much to clean up the area?

For Radiological Dispersal Device (RDD) or Improvised Nuclear Device (IND) incidents, the guidance for cleanup and recovery is contained in new guidelines that were issued in 2006.

The document, which is entitled *Application of Protective Action Guides for Radiological Dispersal Device (RDD) and Improvised Nuclear Device (IND) Incidents*, describes what is called an optimization process for cleanup and recovery.

Every terrorism situation will be different, with impacts potentially ranging from light contamination of a single street or building to situations involving wider destruction and contamination.

Therefore, it makes little sense to have a “one size fits all” approach to cleanup and recovery.

Keeping this in mind, the guidance does not include a pre-established numeric guideline for cleanup.

Rather, the guidance takes the approach that the process of cleanup and recovery should be developed on an incident-specific basis and should engage stakeholders, be inclusive and be community-based. This is called *optimization*.

Q: What is Optimization? How does it work?

A: The idea is to have all interested parties involved in the process, and to find an approach to cleanup and recovery that is best for that particular community.

In choosing among cleanup alternatives, the decision-making process seeks to consider and balance many factors.

These could include:

- the nature of the incident
- the areas impacted (e.g., size, location relative to population)
- the types of contamination
- human health
- public welfare
- ecological risks
- technical feasibility
- how effective clean-up will be
- costs
- potential adverse effects of clean-up activities
- long-term effectiveness
- potential economic effects (e.g., on residents, tourism, business, and industry) and public acceptability.

Optimization is a process that tries to consider all of the relevant factors and to find a balance that is acceptable to a community.

PROTECTING PUBLIC HEALTH IN A RADIATION EMERGENCY

How Do Officials Decide What Steps the Public
Should Take after a Radiological Terrorism Incident?

Understanding Protective Actions and
Protective Action Guides (PAGs)

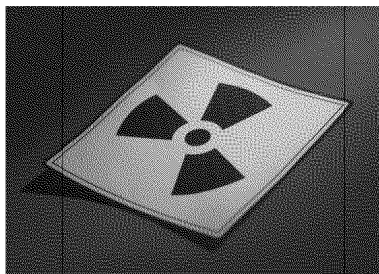
Presented by

Jane Q. Official
Official Title

Name of Radiation, Health or Emergency Management Agency
Location
Date

Why This Presentation?

- Taking the right actions in a radiation emergency is crucial for protecting public health.
- Members of the public often ask how officials decide which steps to advise the public to take.
- Terms such as Protective Actions and Protective Action Guides (PAGs) are unfamiliar to many people.



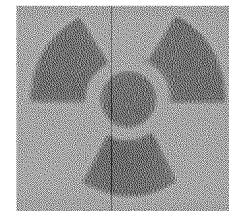
Objectives

- To discuss the meaning and importance of Protective Actions and Protective Action Guides (PAGs) in a radiation emergency
- To discuss how officials decide what actions the public should take following a radiological terrorism incident
- To invite further questions and requests for information

Introduction

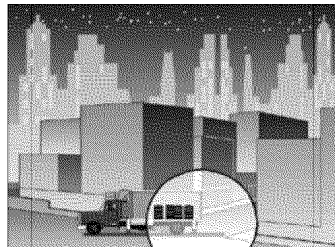
Radiological Dispersal Device (RDD)

- Combination of radioactive material and some means to disperse it
- Many possibilities
 - Liquid
 - Incendiary
 - Aerosol



“Dirty Bomb”

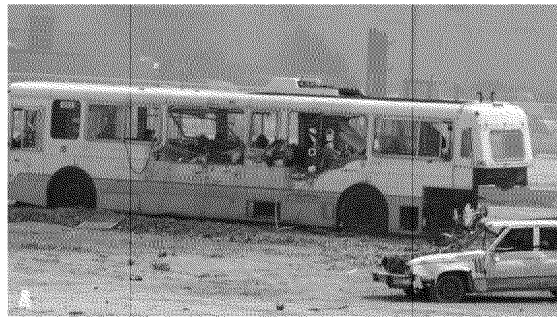
- Combination of radioactive material and conventional explosive (e.g., dynamite, TNT)
 - Examples: truck bomb, planted device



- Does *not* involve a nuclear explosion
 - Dirty bomb lacks the capacity to cause the kind of massive, area-wide destruction and huge numbers of fatalities
 - Still very serious
 - Potential for tens or hundreds of deaths; major social, psychological, behavioral and economic impacts

“Dirty Bomb”

- When the conventional explosive goes off, it does what any bomb does -- kills and maims people and causes damage to nearby structures.



Destroyed city bus after mock RDD attack, TOPOFF 2 national level exercise, Seattle. Photo: Seattle Municipal Archives Photograph Collection. Collection Record Series 0207-01 (Fleets & Facilities Imagebank). Item 138618.

“Dirty Bomb”

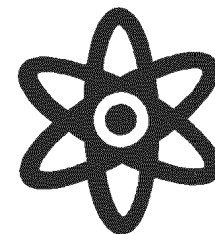
- Direct casualties primarily from detonation of the conventional explosives



TOPOFF 2 RDD Exercise, 2003, Photo credit: Erik Stuhau (Seattle Mayor Greg Nickels' Photo Gallery)

“Dirty Bomb”

- But with a dirty bomb, the explosion also disperses the radioactive material into the surrounding area with the aim of contaminating people, facilities and communities.



Protective Actions, PAGs and Public Health

Protecting Public Health

- In a dirty bomb incident – as in any emergency – the toll in terms of deaths, injuries and illnesses can be significantly reduced if people take the right steps to protect themselves and their loved ones.
- This is where Protective Actions and the Protective Action Guides (PAGs) can help.

Protective Actions

- The urgent steps taken to avoid or reduce radiation dose to the public in an emergency are called protective actions.
- The main protective actions that the public might be asked to take right after a radiation emergency occurs are evacuation or sheltering (staying inside).

Protective Actions

- *Evacuation* involves urgently moving people from an area expected to be in the path of radioactive releases.
- *Sheltering* involves having people stay indoors in their homes, offices, schools, or other buildings while radioactive materials pass over.

How Do Officials Decide Which One to Recommend?

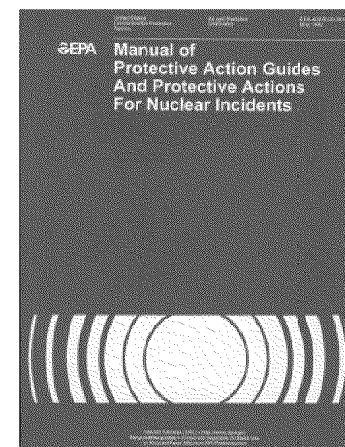
- Officials use something called the PAGs to decide whether people need to take protective actions and which steps will be most effective in avoiding or reducing radiation doses to people.
- The abbreviation “PAGs” is short for *Protective Action Guides*.

What are PAGs?

- *Protective Action Guides*, or *PAGs*, are scientific guides that were created to help officials decide when it is necessary for people to evacuate, shelter, or take other urgent steps to safeguard health after a radiation emergency has occurred.

What is in the PAGs? What Do PAGs Look Like?

- The PAGs developed in 1991 were actually in book form; much of it consists of pages with *equations and tables with numbers developed by scientists.*
- More recent additions to the PAGs are not in book form, but have been published instead in the *Federal Register*.



We consider whether evacuation is warranted at three levels, based on PAGs of 1 rem for effective dose and 0.1 rem for dose to the thyroid. We use the DCFs in Table 5-1 for effective dose and Table 5-2 for thyroid dose from inhalation of radionuclides to calculate the relevant dose, if, as follows:

$$H = \sum_i DCF_i \times C_i$$

where DCF_i = dose conversion factor for radionuclide i , C_i = time-integrated concentration of radionuclide i , and n = the number of radionuclides present.

For the committed effective dose equivalent (see Table 5-1):

$$0.04 < H < 0.125 \times 1.35 \times 10^{-3} \text{ rem}$$

For the committed dose equivalent to the thyroid (see Table 5-2):

$$1.25 \times 10^{-3} < H < 1.25 \times 10^{-2} \text{ rem}$$

The results of these calculations show that, at the location for which these time-integrated concentrations are specified, the committed dose equivalent to the thyroid from inhalation would be over three times the PAG for dose to thyroid, thus justifying evacuation. Using atmospheric diffusion factors, one could calculate the additional distance to which evacuation would be justified.

to avoid exceeding the PAG for thyroid dose.

To use the DCFs from Table 5-1 and 5-2, find the sum:

$$\sum_i \frac{C_i}{T_i}$$

for both effective dose and thyroid dose, where DCE is the derived response level for radionuclide i , and C_i is defined above. If the sum in either case is equal to or greater than unity, evacuation of the general population is warranted.

For effective dose (see Table 5-1):

$$\frac{DCE}{1.35 \times 10^{-3}} < \frac{DCE}{1.35 \times 10^{-3}} < 0.7$$

For dose to the thyroid (see Table 5-2):

$$\frac{1.25 \times 10^{-3}}{1.25 \times 10^{-3}} < 1$$

It is apparent that these calculations yield the same conclusions as those using the DCFs.

5.4.3 Comparison with previously recommended PAFs

Many emergency response plans have already been developed using previously recommended PAFs that apply to the dose equivalent to the whole body from direct (external) radiation from the plant and to the thyroid from inhalation of radionuclides. For nuclear power plant incidents, the

How are the PAGs Used?

- Every emergency situation is different, and the best action or set of actions in one situation may not be appropriate at another time or in another situation.
- Knowing *when* emergency steps need to be taken, and *which* steps are warranted, is important for protecting the health of the public.

How are the PAGs Used?

- The scientific information in the PAGs provides general guidance to officials, which they can use in combination with their knowledge of local conditions, to make these important decisions.

To What Kinds of Emergencies Do the PAGs Apply?

- The first Protective Action Manual, which was published by the EPA in 1975, focused only on accidents at commercial nuclear power plants.

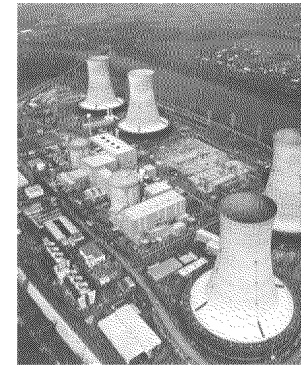


Photo: Three Mile Island: A Report to the Commissioners and the Public. NUREG/CR-1250, Volume 1. U.S. Nuclear Regulatory Commission.

- But in 1991 the PAGs were expanded to cover all types of peacetime radiation emergencies (including those involving transportation, research and hospitals).

To What Kinds of Emergencies Do the PAGs Apply?

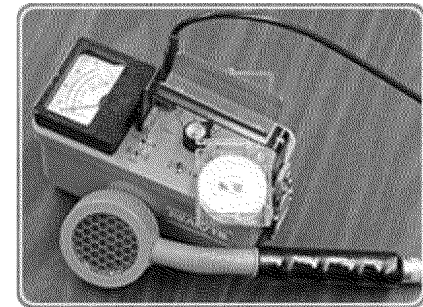
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- In addition, the 1991 Manual added guidance from the FDA and FEMA on the use of KI, potassium iodide, in situations involving the release of radioactive iodine.

To What Kinds of Emergencies Do the PAGs Apply?

- More recently, in 2006, the PAGs were revised further to cover terrorism involving radioactive materials.
- This includes both radiological dirty bombs (or other radiological dispersal devices, RDDs) and the exploding of a crude nuclear bomb (an IND, or improvised nuclear device).
- Today, emergency responders and government officials can use the PAGs for any radiation emergency.

How do Officials Know When it is Time to Act?

- When a radiation emergency (including a dirty bomb incident) occurs, officials will use available information and computer models to quickly predict how much radiation people could potentially receive from the incident.
- This estimate is then compared with decision levels described in the PAGs.



How do Officials Know When it is Time to Act?

- If the dose that could result from the emergency has the potential to go higher than the decision levels listed in the guidelines, the PAGs indicate what general actions can be taken to *avoid* the exposure from taking place.
- In other words, PAGs are general guidelines for deciding when specific steps are needed to *prevent* people from being exposed to a level of radiation that might be hazardous to health.

Why Not Just Carry Out Every Protective Action as Soon as a Radiation Emergency Occurs?

- Different protective actions are appropriate for different situations.
- Doing “everything at once” is not possible. For example, people cannot take shelter (stay indoors) and evacuate at the same time.

Why Not Just Carry Out Every Protective Action as Soon as a Radiation Emergency Occurs?

- Officials need to see what kind of threat the emergency poses to people so they can provide the best advice to people on how to protect health.

Why Don't Officials Just Automatically Tell Everyone to Evacuate?

- Evacuation is one of the two main protective actions that can be taken in the immediate hours or first few days of a radiation emergency, and sometimes it is necessary for protecting people's health.
- But there are also situations when sheltering may be a better choice for preventing or reducing radiation exposure.



Why Don't Officials Just Automatically Tell Everyone to Evacuate?

- For example, if a cloud containing radioactive particles is expected to pass over an area very soon and then leave quickly, evacuation could actually expose people to more radiation than staying indoors.
- This is because evacuation takes time, and many people might be caught outside or in their cars when the cloud passed over.

Why Don't Officials Just Automatically Tell Everyone to Evacuate?

- In such a situation, people staying indoors while the cloud passed by would be **more protected** than those caught outside trying to evacuate.
- Sheltering also has the advantage of being less disruptive than evacuation and of enabling people to stay in familiar surroundings and have ready access to communication, food, and water.

Why Don't Officials Just Automatically Tell Everyone to Evacuate?

- In some situations, evacuation may also not be practical.
- Blocked highways, for example, could make evacuation difficult.
- Severe weather at the time of the radiation emergency could also make evacuation dangerous.

Why Don't Officials Just Automatically Tell Everyone to Evacuate?

- It is also important to remember that evacuations can themselves create certain risks to people.
 - With large numbers of people suddenly taking to the highways, automobile accidents occur and people can be killed or injured.
 - Likewise, evacuations can be very difficult on people who are ill or in medical care. So, evacuations should only take place if they are necessary.



Photo: Three Mile Island: A Report to the Commissioners and the Public. NUREG/CR-1250, Volume 1. U.S. Nuclear Regulatory Commission.

Why Don't Officials Just Automatically Tell Everyone to Evacuate?

- If the risks from a protective action such as a major evacuation are greater than the risks to people from the emergency situation itself, it makes no sense to carry out the protective action.

Taking the Right Steps

- Officials using the PAGs and information about local conditions will tell the public whether evacuation, sheltering, or other steps are needed in a radiation emergency.
- Taking the correct steps is important for protecting yourself and your loved ones.

Beyond Evacuation or Sheltering, Are There Other Steps Officials Might Recommend?

- Sheltering or evacuation may be supplemented by
 - *limiting access* to (keeping people out of) the location where the emergency has taken place
 - *decontaminating people*, which means to remove any radioactive particles that may have fallen onto people's clothes, skin, or hair. Decontamination is done by having people remove their clothes and put them in a plastic bag, take a warm shower with lots of soap, wash their hair with only shampoo (no conditioner) or soap and water, and change clothes. Pets and service animals can also be decontaminated.

Beyond Evacuation or Sheltering, Are There Other Steps Officials Might Recommend?

- Actions might be taken to prevent radioactive contamination from entering the food chain.
- Officials might put special *controls on selected foods* suspected of being contaminated.
- They might also temporarily *put livestock on previously stored feed and water*, rather than allowing them go graze in potentially contaminated areas.

Beyond Evacuation or Sheltering, Are There Other Steps Officials Might Recommend?

- In situations where radioactive iodine has been released into the environment, officials may distribute something called potassium iodide, or KI, to protect people's thyroid glands.
- KI is a non-radioactive form of iodine. When it is taken, it fills the thyroid with regular (non-radioactive) iodine so that the radioactive iodine is not absorbed.
- KI only protects the thyroid and it is only useful in situations involving radioactive iodine; *it does not help in other situations. It is not an antidote to radiation.*

Beyond Evacuation or Sheltering, Are There Other Steps Officials Might Recommend?

- It is very unlikely that radioactive iodine will be released in a dirty bomb attack. So KI is unlikely to be helpful in a dirty bomb situation.
- In the rare case that radioactive iodine is released, officials will notify the public and provide instructions on what to do.
- Never take KI, and never give it to children, unless local health officials, emergency management officials, or your doctor specifically tell you it is needed.

Taking the Right Steps

- Officials using the PAGs and information about local conditions will tell the public which steps, if any, are needed.
- Taking the correct steps is important for protecting yourself and your family.

Who Decides Which Protective Actions to Recommend?

- Under the system of government and the laws we have in the U.S., states and local governments have the main responsibility for deciding upon and taking measures to protect life and health.
- This is true for all kinds of disasters, except war and declared national emergencies.

Who Decides Which Protective Actions to Recommend?

- The federal government's role in disasters is to provide assistance when it is needed.
- In a radiation emergency, state and local emergency response agencies use the PAGs developed by the federal government, along with their knowledge of local conditions, to decide when special actions are needed to avoid radiation exposure and protect people's health.

What Role Do PAGs Play in Protecting People Once the Immediate Emergency is Over?

- The steps described earlier are used to protect people in the early hours and days of a radiation emergency. (This is sometimes referred to as the *Early Phase*.)
- But once the immediate emergency has passed, officials may recommend other steps to help protect people from longer-term exposure.

What Role Do PAGs Play in Protecting People Once the Immediate Emergency is Over?

- These cover what is known as the *Intermediate Phase* (which begins as soon as the emergency has been brought under control and can last days to months) and the *Late Phase* (which involves cleanup and recovery efforts lasting months to years).

What Role Do PAGs Play in Protecting People Once the Immediate Emergency is Over?

- One such measure is *decontamination of land and property*, which involves cleaning radioactive contamination from an area so that people can reoccupy it.
- When this is not possible, another measure – *relocation* – may be required. Relocation involves moving people from an area and continuing to keep them from returning.

After a Radiological Terrorism Attack, How Do Officials Decide What Needs to Be Done to Clean Up the Area?

- For Radiological Dispersal Device (RDD) incidents, including dirty bombs, the guidance for cleanup and recovery is contained in a document issued in 2006.
- The document is entitled *Application of Protective Action Guides for Radiological Dispersal Device (RDD) and Improvised Nuclear Device (IND) Incidents*.

After a Radiological Terrorism Attack, How Do Officials Decide What Needs to Be Done to Clean Up the Area?

- The document notes that every terrorism situation will be different, with impacts potentially ranging from light contamination of a single street or building to situations involving wider destruction and contamination.
- Therefore, it makes little sense to have a “one size fits all” approach to cleanup and recovery.

After a Radiological Terrorism Attack, How Do Officials Decide What Needs to Be Done to Clean Up the Area?

- Keeping this in mind, the guidance does not include a pre-established numeric guideline for cleanup.
- Rather, the guidance takes the approach that the process of cleanup and recovery should be *community-based* and developed on an *incident-specific basis*. This is called *optimization*.

What is Optimization?

- The idea is to have all interested parties involved in the process, and to find an approach to cleanup and recovery that is best for that particular community.
- In choosing among cleanup alternatives, the decision-making process seeks to consider and balance many factors.

What is Optimization?

How Does it Work?

- These could include:
 - the nature of the incident
 - the areas impacted (e.g., size, location relative to population)
 - the types of contamination
 - human health
 - public welfare
 - ecological risks
 - technical feasibility
 - how effective clean-up will be
 - costs
 - potential adverse effects of clean-up activities
 - long-term effectiveness
 - potential economic effects (e.g., on residents, tourism, business, and industry) and public acceptability.

What is Optimization?

How Does it Work?

- Optimization is a process that tries to consider all of the relevant factors and to find a balance that is acceptable to a community.

Finding Out More

On the web: www.agency.etc

Telephone: 1-800-123-4567